

# Hunters Point Naval Shipyard, Parcel G, RSY Data Report

Contract No. N62473-17-D-006 CTO N6247318F5065 RSY Pad Data Report							
RSY Pad: RSY 26B Use 1				Soil Origin: TU-100A SFU			
Data attached and submitted by: Amy Mangel				Data Report Submittal Date: 08/18/2020			

Systematic Soil Sample Data: RSY 26B Use 1							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 NaI Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	<sup>90</sup> Sr Final Analytical Results (pCi/g)
Project Remediation Goals*							
HPPG-SFU-TU100A-001	1	Systematic	8,613	16,729	0.208	0.00356	0.0736
HPPG-SFU-TU100A-002	2	Systematic	10,004	16,729	0.567	-0.0453	N/A
HPPG-SFU-TU100A-003	3	Systematic	9,877	16,729	0.246	-0.0383	N/A
HPPG-SFU-TU100A-004	4	Systematic	7,731	16,729	0.154	-0.0477	N/A
HPPG-SFU-TU100A-005	5	Systematic	9,627	16,729	0.471	0.00288	N/A
HPPG-SFU-TU100A-006	6	Systematic	8,016	16,729	0.286	0.0059	N/A
HPPG-SFU-TU100A-007	7	Systematic	8,584	16,729	0.395	0.00573	N/A
HPPG-SFU-TU100A-008	8	Systematic	9,043	16,729	0.26	0.0155	N/A
HPPG-SFU-TU100A-009	9	Systematic	8,779	16,729	0.507	-0.0116	N/A
HPPG-SFU-TU100A-010	10	Systematic	8,984	16,729	0.417	0.00355	N/A
HPPG-SFU-TU100A-011	11	Systematic	9,316	16,729	0.24	-0.023	0.181
HPPG-SFU-TU100A-012	12	Systematic	9,366	16,729	0.242	-0.039	N/A
HPPG-SFU-TU100A-013	13	Systematic	9,911	16,729	0.565	0.0239	N/A
HPPG-SFU-TU100A-014	14	Systematic	9,536	16,729	0.451	-0.00361	N/A
HPPG-SFU-TU100A-015	15	Systematic	7,403	16,729	0.308	-0.0299	N/A
HPPG-SFU-TU100A-016	16	Systematic	10,836	16,729	0.528	-0.0468	N/A
HPPG-SFU-TU100A-017	17	Systematic	10,995	16,729	0.406	0.0276	N/A
HPPG-SFU-TU100A-018	18	Systematic	10,136	16,729	0.439	-0.0354	N/A
HPPG-SFU-TU100A-019	19	Systematic	11,291	16,729	0.625	-0.00332	N/A
HPPG-SFU-TU100A-020	20	Systematic	10,758	16,729	0.347	0.0185	N/A
HPPG-SFU-TU100A-021	21	Systematic	9,712	16,729	0.175	0.0266	0.103
HPPG-SFU-TU100A-022	22	Systematic	10,763	16,729	0.392	0.0133	N/A
HPPG-SFU-TU100A-023	23	Systematic	11,039	16,729	0.45	0.000148	N/A
HPPG-SFU-TU100A-024	24	Systematic	9,939	16,729	0.0904	-0.0164	N/A
HPPG-SFU-TU100A-025	25	Systematic	10,797	16,729	0.401	-0.0251	N/A
Soil Systematic Sample Statistics					<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	<sup>90</sup> Sr Final Analytical Results (pCi/g)
					Maximum	0.625	0.0276
					Mean	0.3668	-0.0087
					Median	0.395	-0.0033
					Minimum	0.0904	-0.0477
					Standard Deviation	0.1414	0.0244

Biased Soil Sample Data: RSY 26B Use 1							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 NaI Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	<sup>90</sup> Sr Final Analytical Results (pCi/g)
Project Remediation Goals*							
HPPG-SFU-TU100A-B-001	1	Biased	10,406	16,729	0.410	-0.0269	0.209

CPM Counts per minute

pCi/g Picocuries per gram

\* Note: Project Remediation goal (RG) is the Record of Decision RG or Offsite RBA value, whichever is higher

Instrument and Survey Summary					
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #
Gamma Walkover Survey	HPRS-06092021-PG-ROV2-631	06/09/2021	RS-700	03/31/2022	5447/5448
Follow-Up Static Survey	HPRS-06112021-PG-JSS-651	06/11/2021	RS-700	03/31/2022	5447/5448
Systematic Sample Survey	HPRS-06102021-PG-JSS-642	06/08/2021	3x3	05/12/2022	117336
Biased Sample Survey	HPRS-06152021-PG-JSS-668	06/09/2021	3x3	05/12/2022	117336
Systematic Sample # -006 Resample Survey	HPRS-06172021-PG-JSS-682	06/17/2021	3x3	05/12/2022	117336

Region of Interest (ROI) Summary	
ROI	Nuclide and Energy
ROI 3	Ra-226 (1764 keV)
ROI 6	Ra-226 (609 keV)
ROI 7	Cs-137 (662 keV)
ROI 8	Ra-226 (351 keV)
ROI 10	Gross Gamma

Summary: RSY 26B Use 1
1) Gamma walkover survey and data review—upon review of initial RS-700 scan data in accordance with Final Parcel G Work Plan Section 3.5.1.1, 15 follow-up static investigations were required. Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6. Contour maps of the scan data for the ROIs of interest are presented on page 7. The RSY scan data was lower than the background scan data. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection. This pad was only partially filled, hence the small number of scan data points.
2) One-minute static follow-up measurements with the RS-700 were collected at 15 gamma walkover investigation locations in accordance with Final Parcel G Work Plan Section 3.3.1. A map of the follow-up locations is presented on page 9. The net follow-up static spectra are presented on pages 14-28. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
3) In accordance with Final Parcel G Work Plan Section 3.4.1, twenty-five systematic soil samples (001-025) were obtained and submitted for gamma spectroscopy analysis. Sample locations are shown on the Systematic Sample Survey map (page 10). TestAmerica sample results are attached (pages 29-66; 82-93). Ten percent of the systematic soil samples (three samples in total -001, -011, & -021) were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 56-90). Samples HPPG-F-073 and HPPG-F-074 are field duplicates, correlating to systematic samples -010 and -025. The Data Quality Assessment which will be included in the RACR will provide an analysis and discussion of field duplicates for the project.
Note: During sample preparation at the TestAmerica lab, the can holding systematic sample HPPG-SFU-TU100A-006 failed, resulting in the loss of all sample material (see TestAmerica note on page 32). Systematic sample HPPG-SFU-TU100A-006 was recollected from the RSY pad and sent to TestAmerica for analysis (pages 82-93). The sample results reported on page 1 for this sample are the final results from the re-sample.
Systematic sample histograms, box plots, Q-Q plots, and power curves are provided on pages 12-13. All sample results were below the applicable RGs. The number of samples collected was sufficient to meet project DQOs.
4) In accordance with Final Parcel G Work Plan Section 3.3.1, one biased sample was collected from the location of the highest gross gamma scan measurement, since all follow-up static measurements were below the ROC-specific critical levels. TestAmerica sample results are attached (pages 67-81). A map of the biased sample location is presented on page 11. Biased sample results were all below the applicable RGs.
<b>Conclusions:</b>  In accordance with the DQOs in Section 3.1 of the Final Parcel G Work Plan, final analytical results for all samples from the RSY pad were shown by a point by point comparison to meet the RGs. Graphical comparisons demonstrated that ROC concentrations were consistent with background.  RSY 26B Use 1 contains soil from Hunters Point Naval Shipyard Parcel G Phase 1 excavation TU-100A SFU.  APTIM requests RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be used as backfill for TU-100.

## Soil Scan Statistics

### Statistical Summary

Dataset		PG-RSY-26B-U1				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		2.00	25.06	11.37	11.02	3.80
ROI-06		45.08	119.23	82.57	83.18	14.64
ROI-07		32.06	97.23	64.88	65.15	11.72
ROI-08		60.12	155.33	104.63	105.24	16.78
ROI-10		1,546.12	2,563.94	2,148.64	2,184.51	232.65

### Statistical Summary Reference Background

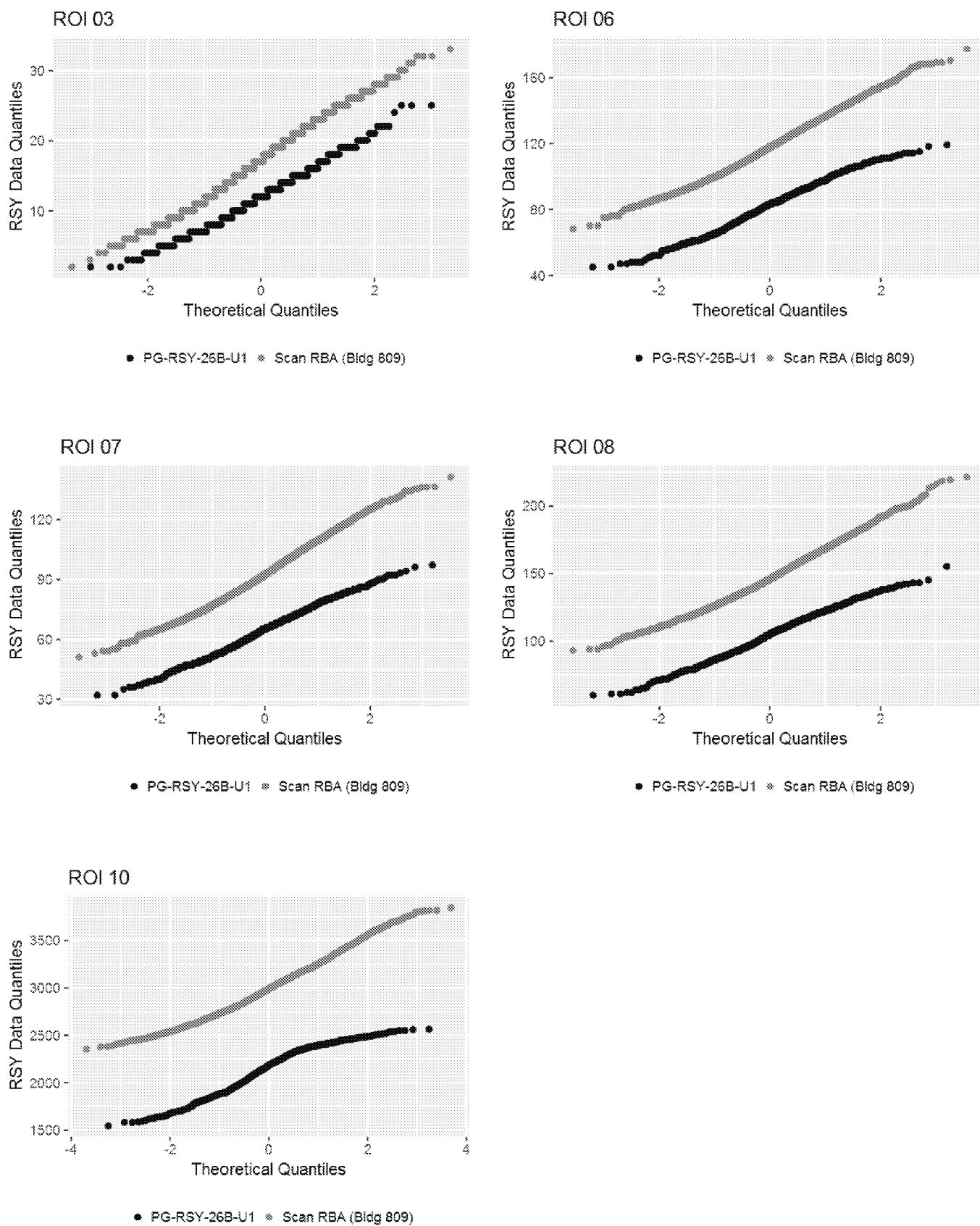
TYPE		Scan RBA (Bldg 809)				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		2.00	33.08	16.21	16.04	4.13
ROI-06		68.15	177.45	117.58	117.26	15.50
ROI-07		51.11	141.33	92.34	91.24	13.43
ROI-08		93.19	221.48	146.24	145.30	18.21
ROI-10		2,354.11	3,845.31	2,995.57	2,989.64	255.66

cps = counts per second

Dataset	Number of Data Points
PG-RSY-26B-U1	863
Scan RBA (Bldg 809)	4705

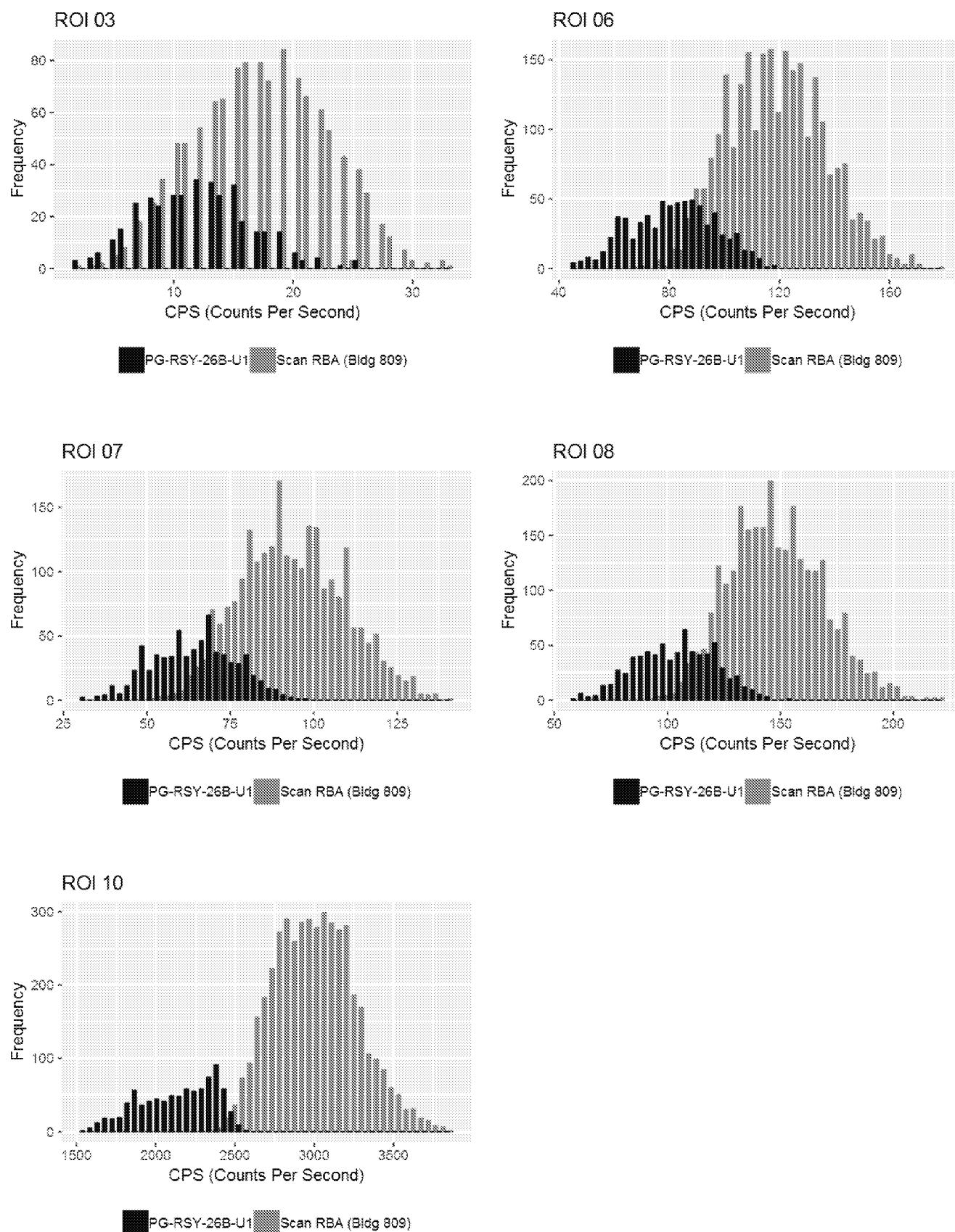
## Soil Scan Statistics

### Normal Q-Q Plots



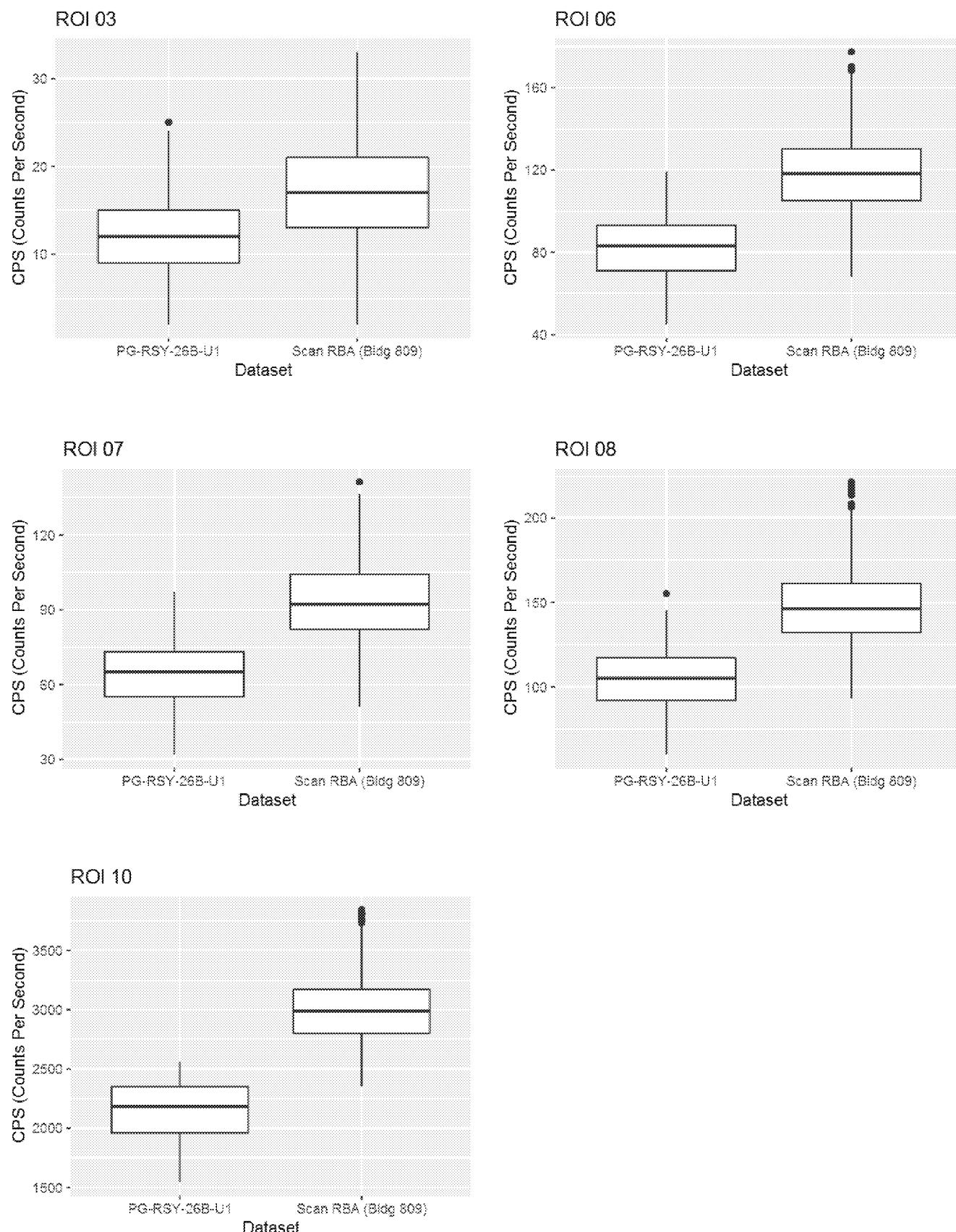
## Soil Scan Statistics

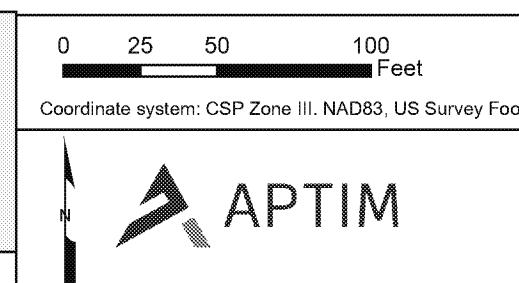
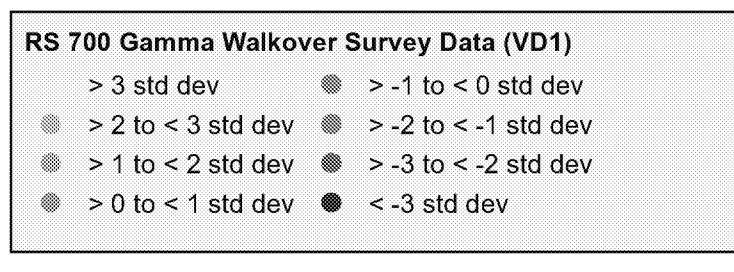
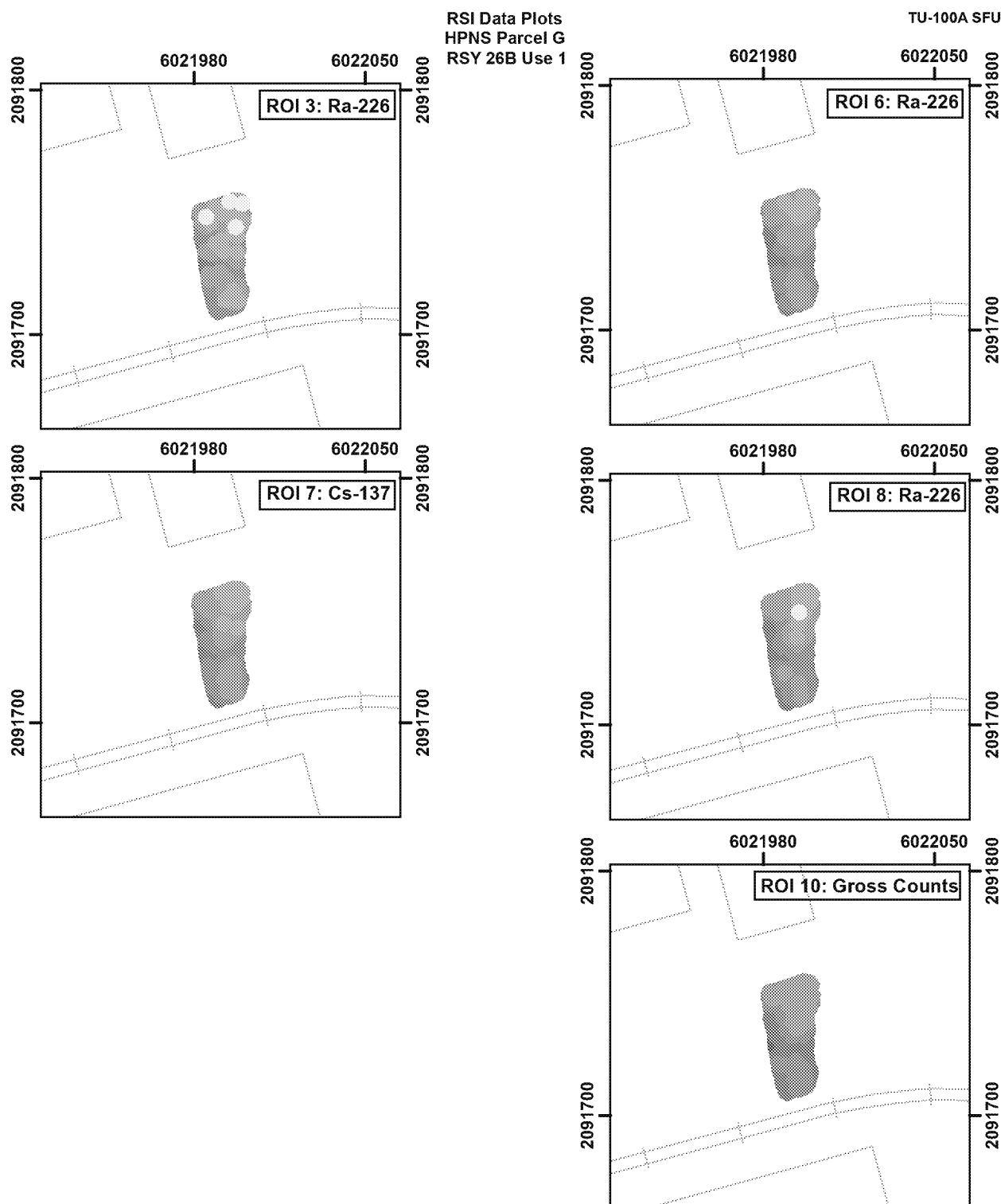
### Histograms

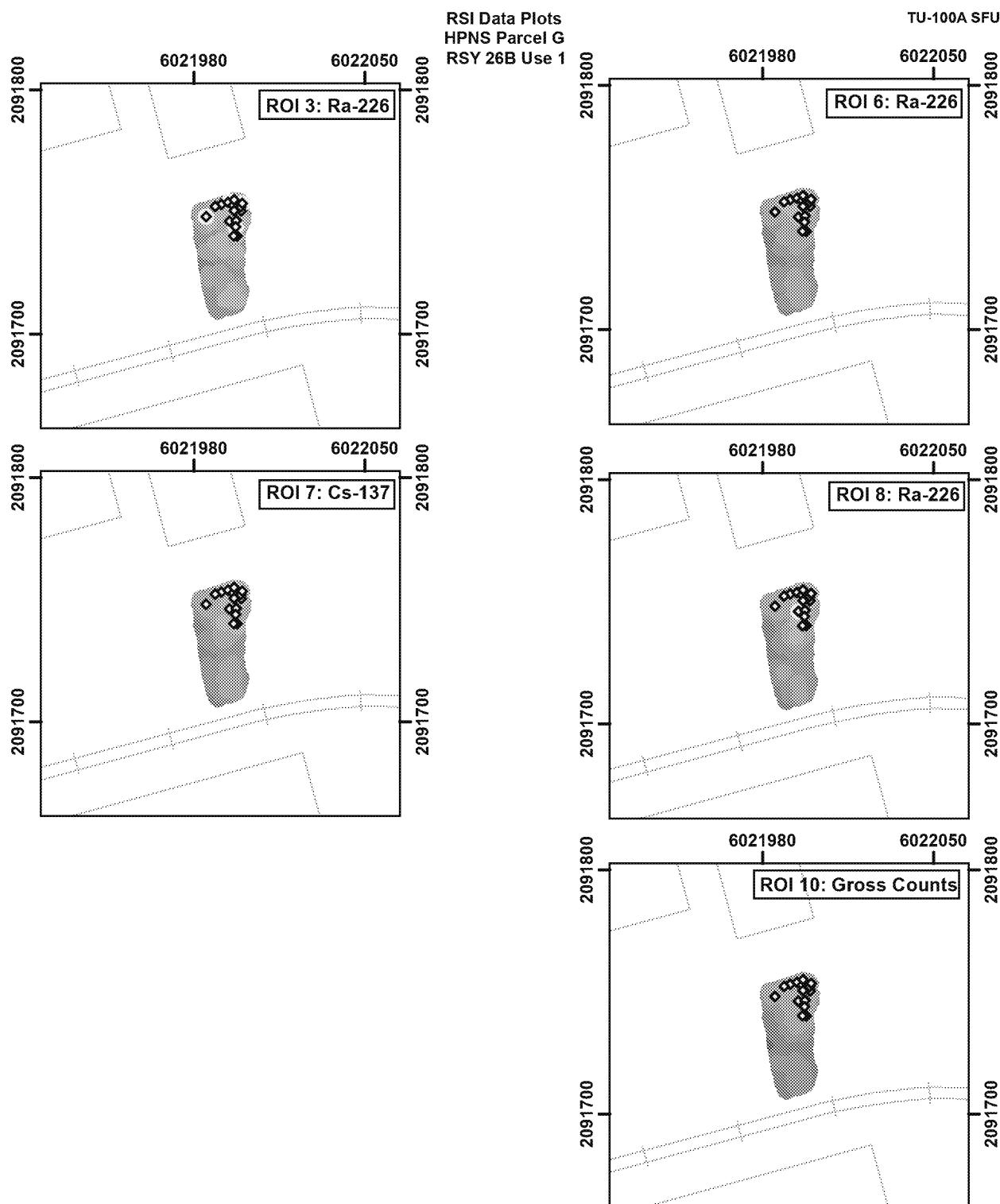


## Soil Scan Statistics

### Box Plots





**RS 700 Gamma Walkover Survey Data (VD1)**

- |                    |                       |
|--------------------|-----------------------|
| > 3 std dev        | > -1 to < 0 std dev   |
| ●                  | ●                     |
| > 2 to < 3 std dev | > -2 to < -1 std dev  |
| ●                  | ●                     |
| > 1 to < 2 std dev | > -3 to < -2 std dev  |
| ●                  | ●                     |
| > 0 to < 1 std dev | < -3 std dev          |
| ●                  | ◆ Follow-Up Locations |

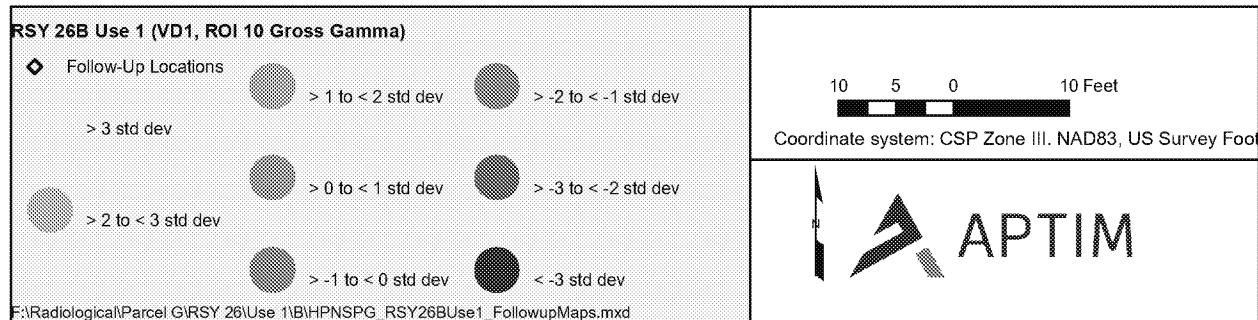
0      25      50      100  
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



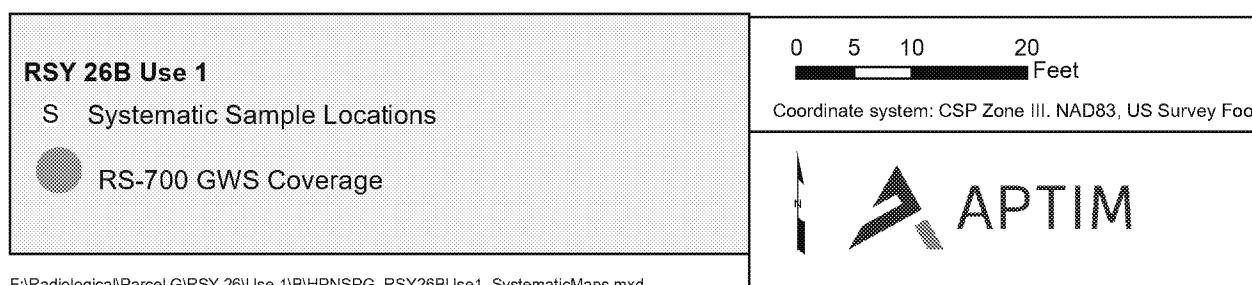
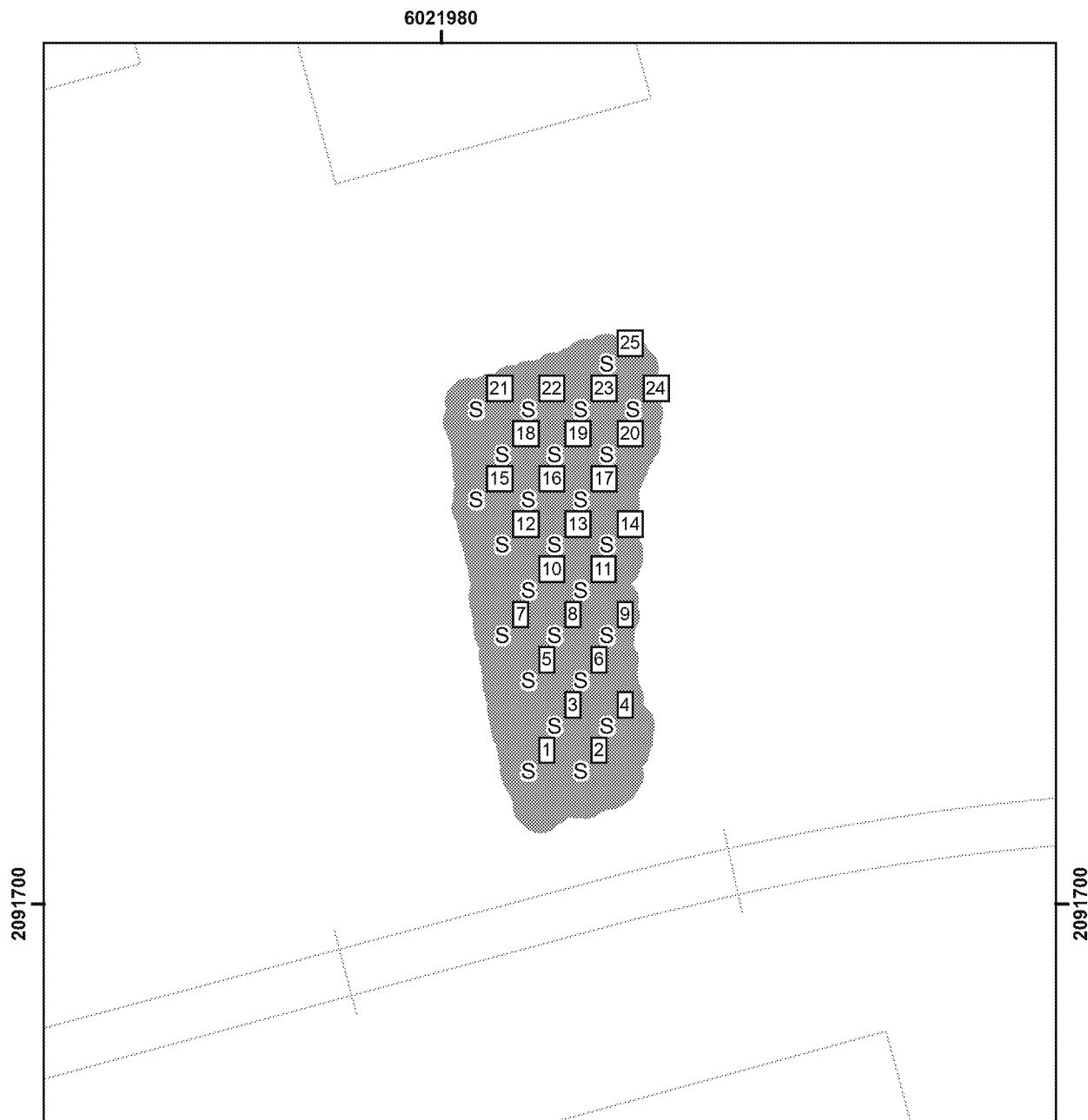
**Follow-Up Static Survey  
HPNS Parcel G  
RSY 26B Use 1**

TU-100A SFU



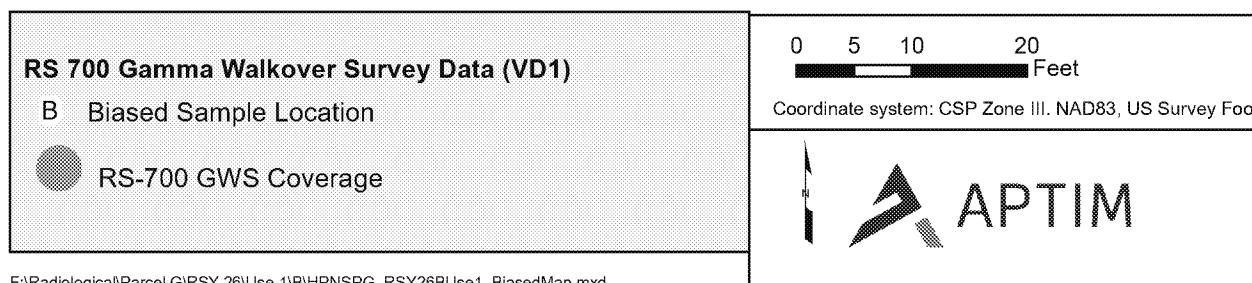
Systematic Sampling  
HPNS Parcel G  
RSY 26B Use 1

TU-100A SFU

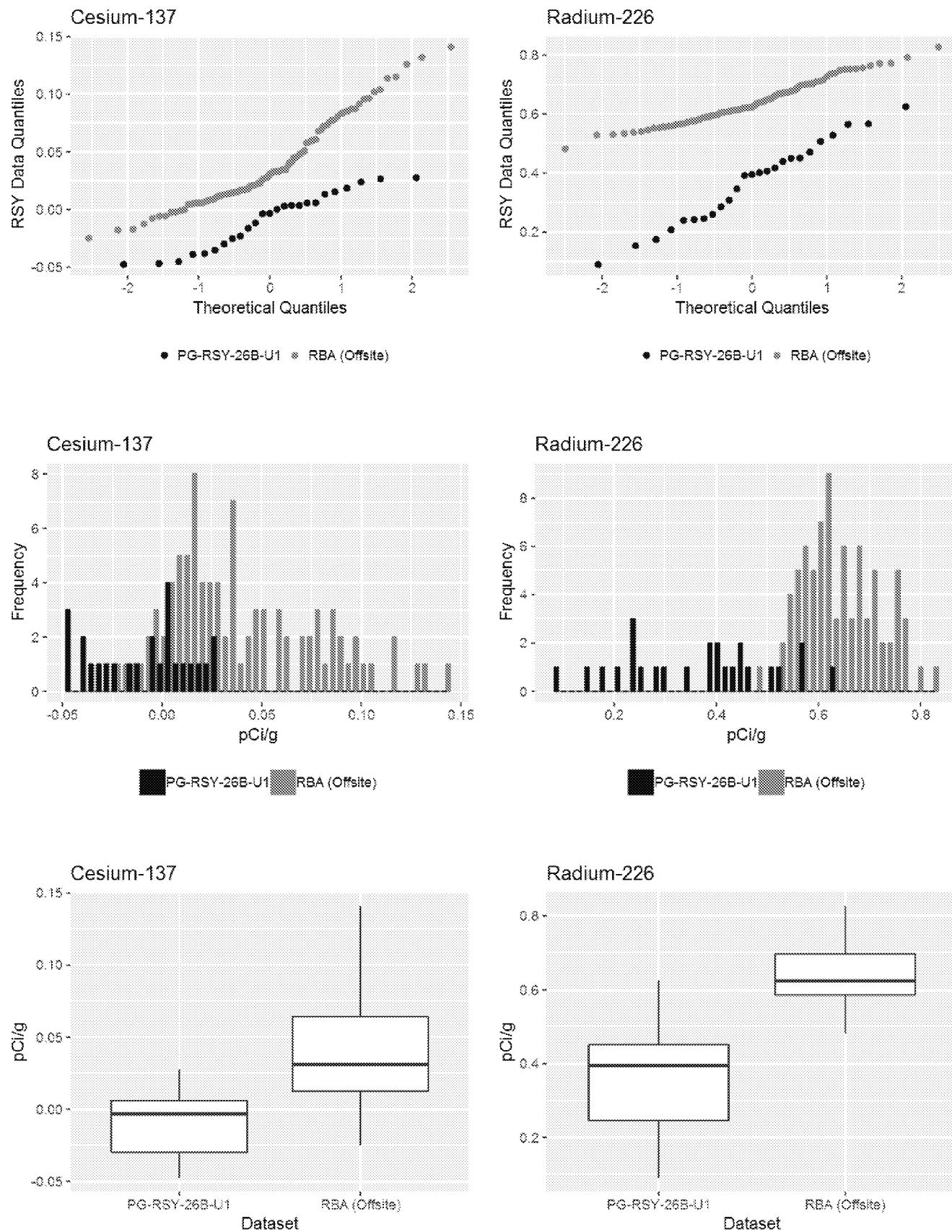


Biased Sampling  
HPNS Parcel G  
RSY 26B Use 1

TU-100A SFU



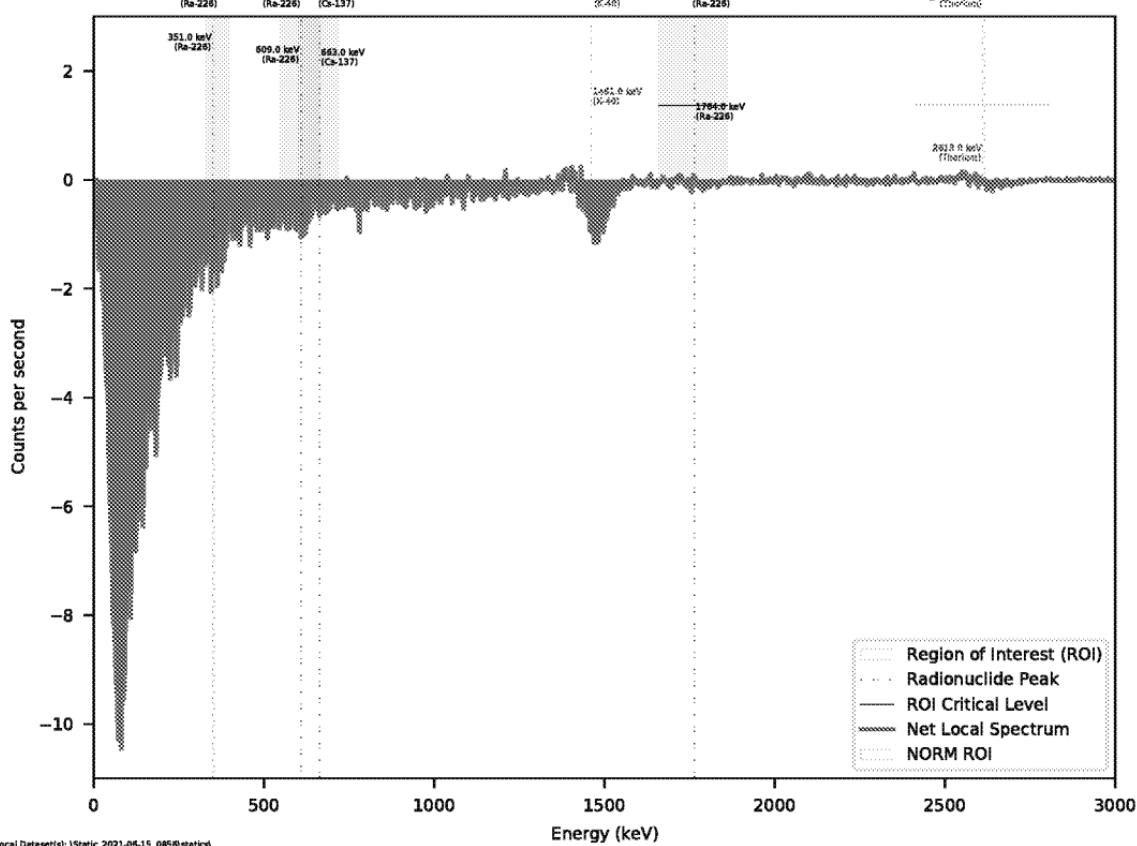
## Soil Sample Statistics





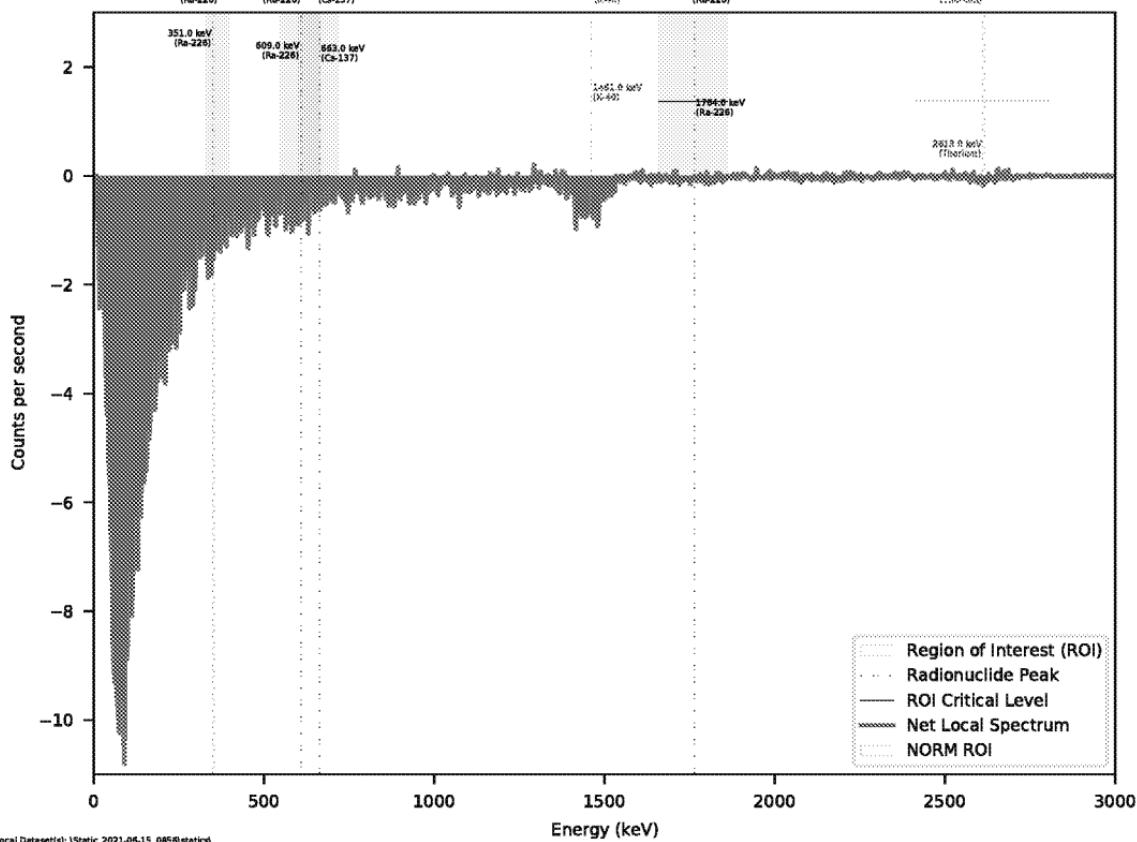
## Net Gamma Spectrum, Static Location: 1

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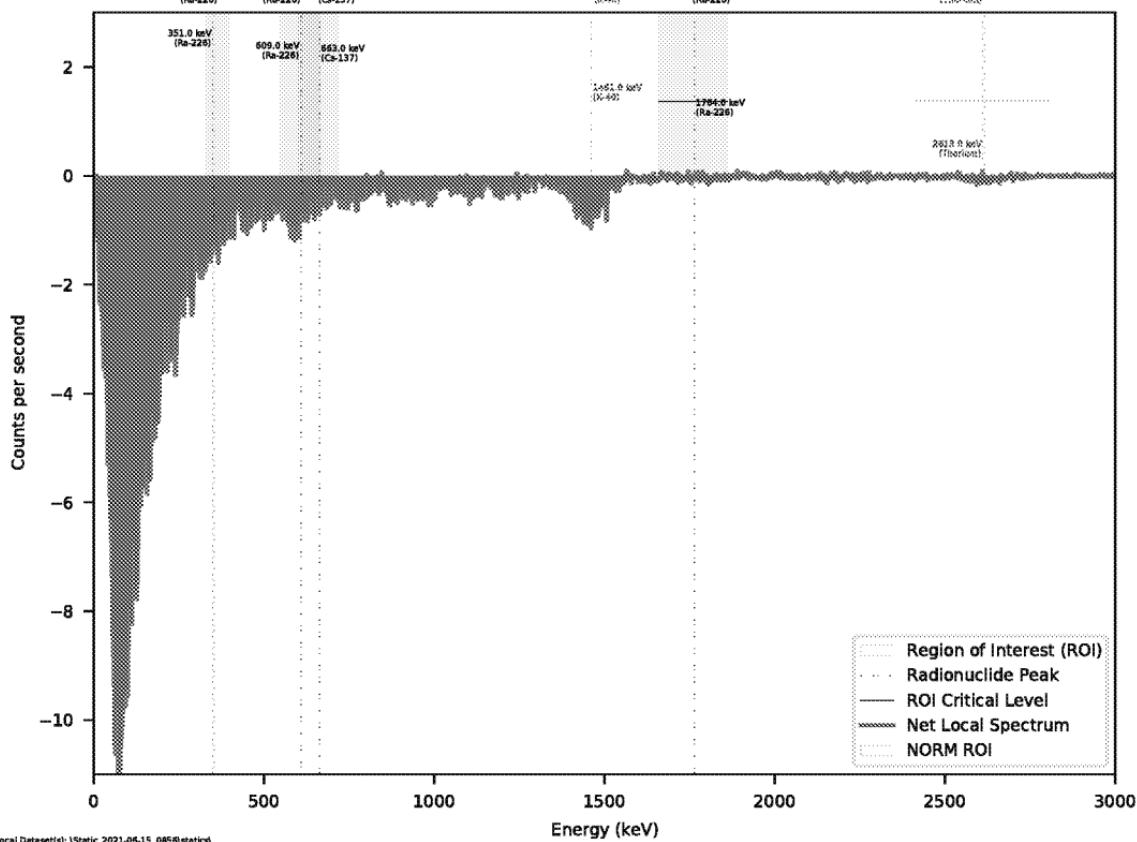
## Net Gamma Spectrum, Static Location: 2

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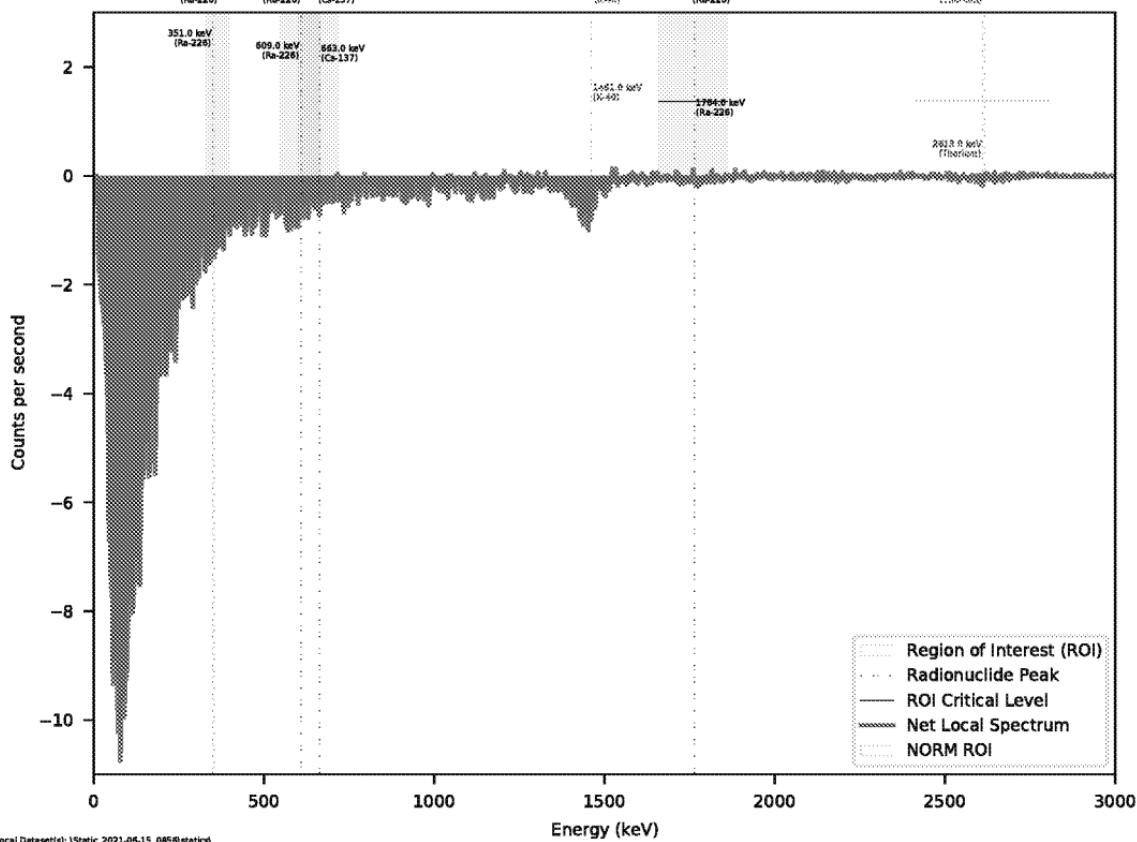
## Net Gamma Spectrum, Static Location: 3

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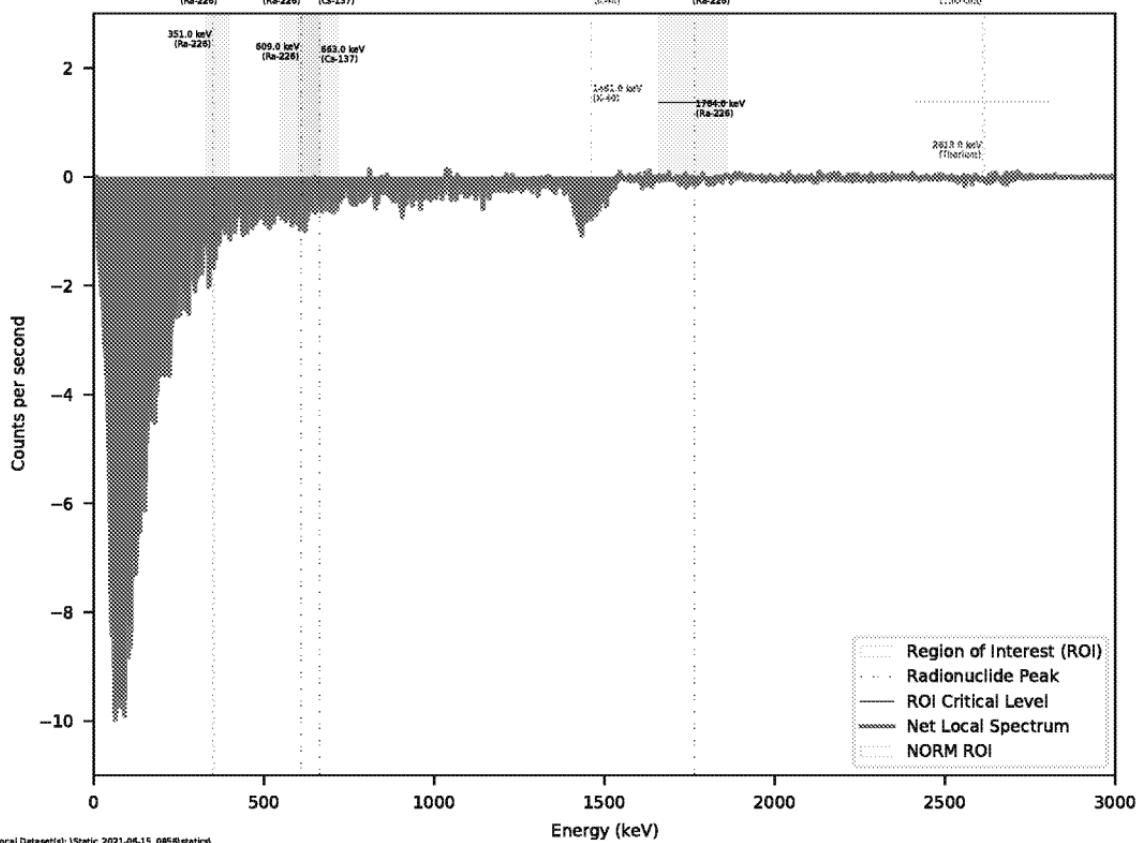
## Net Gamma Spectrum, Static Location: 4

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## Net Gamma Spectrum, Static Location: 5

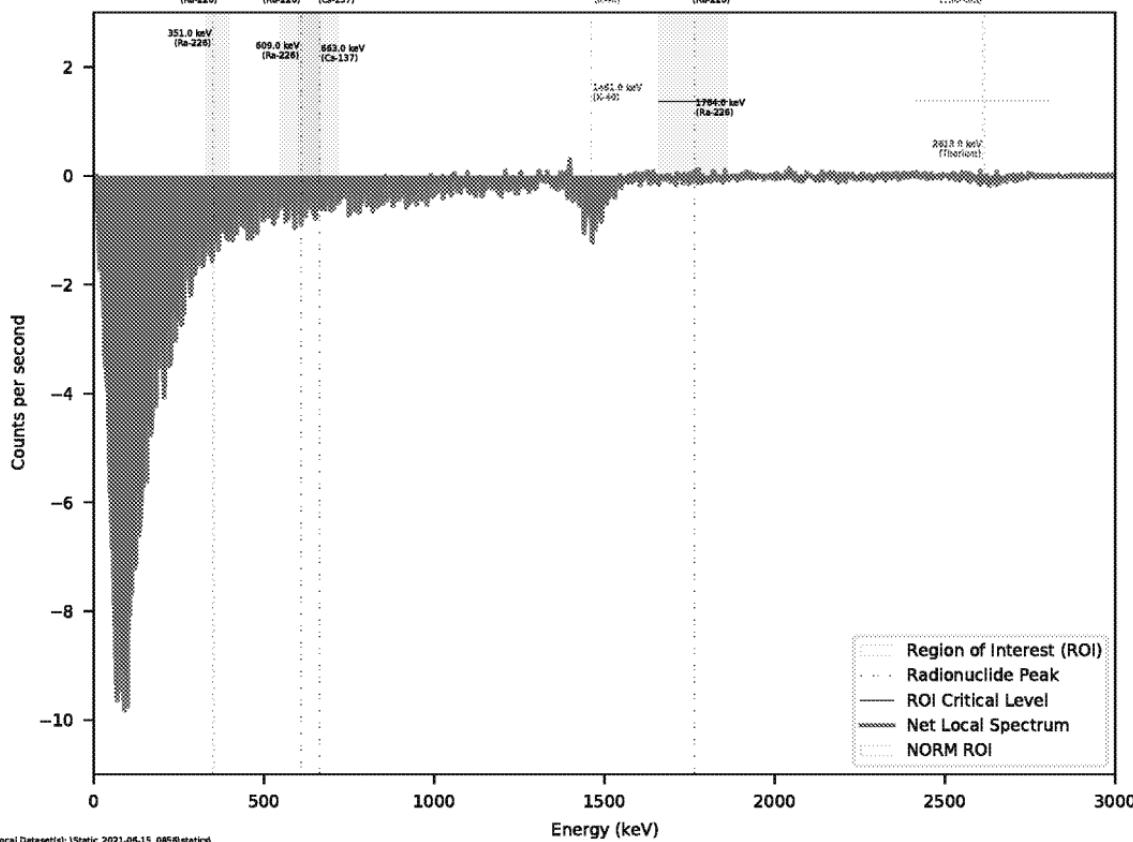
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ED\_006360A\_00000147-00018

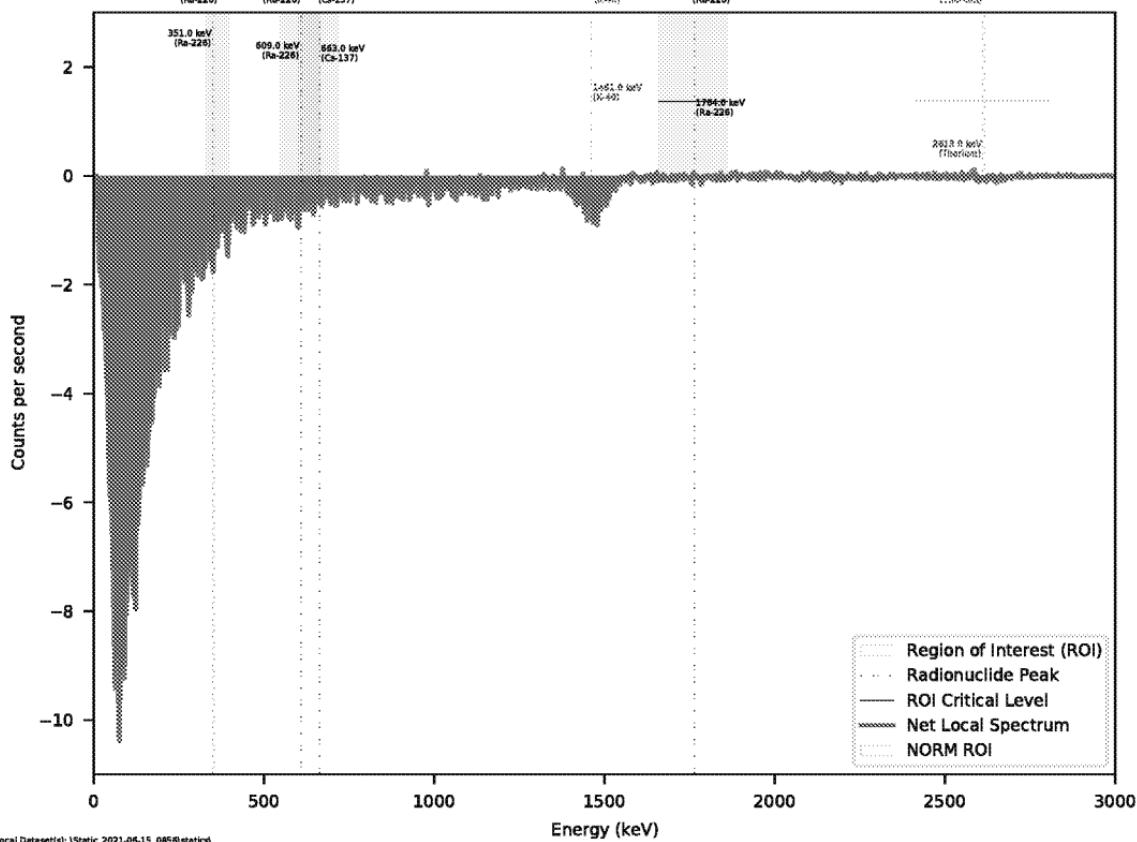
## Net Gamma Spectrum, Static Location: 6

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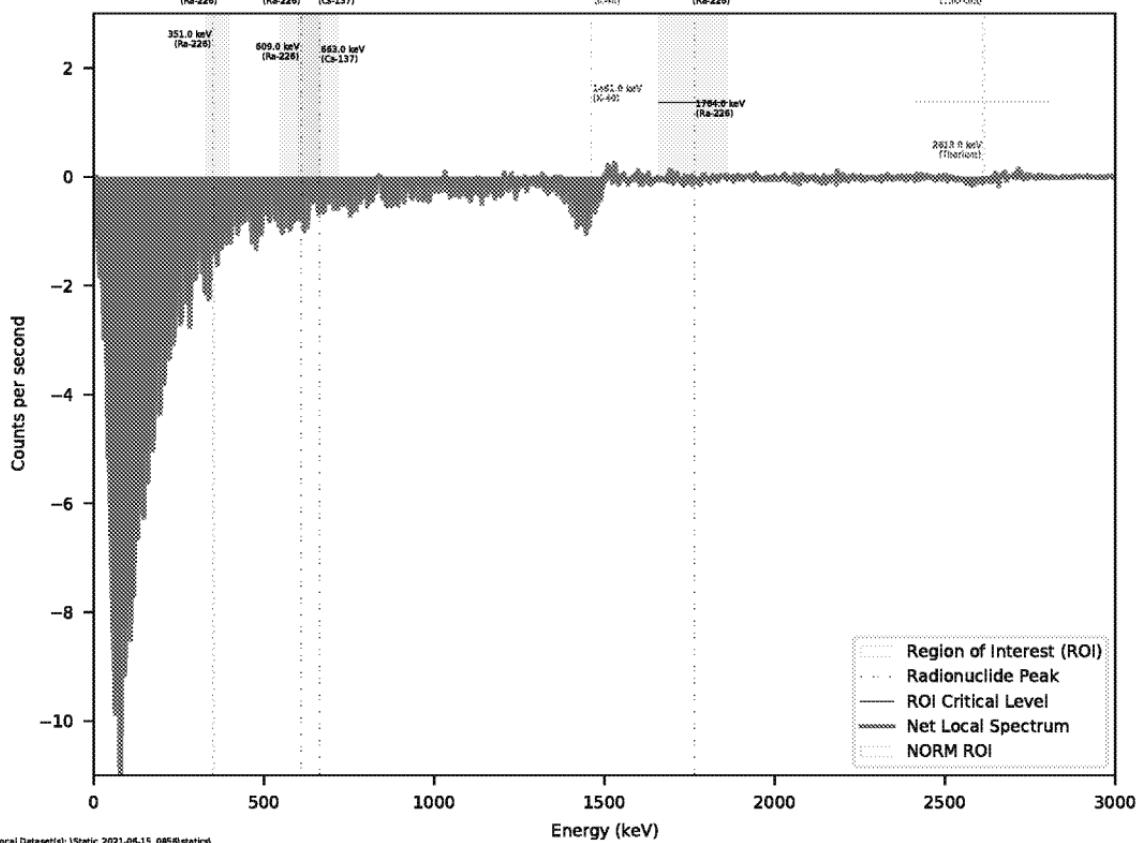
## Net Gamma Spectrum, Static Location: 7

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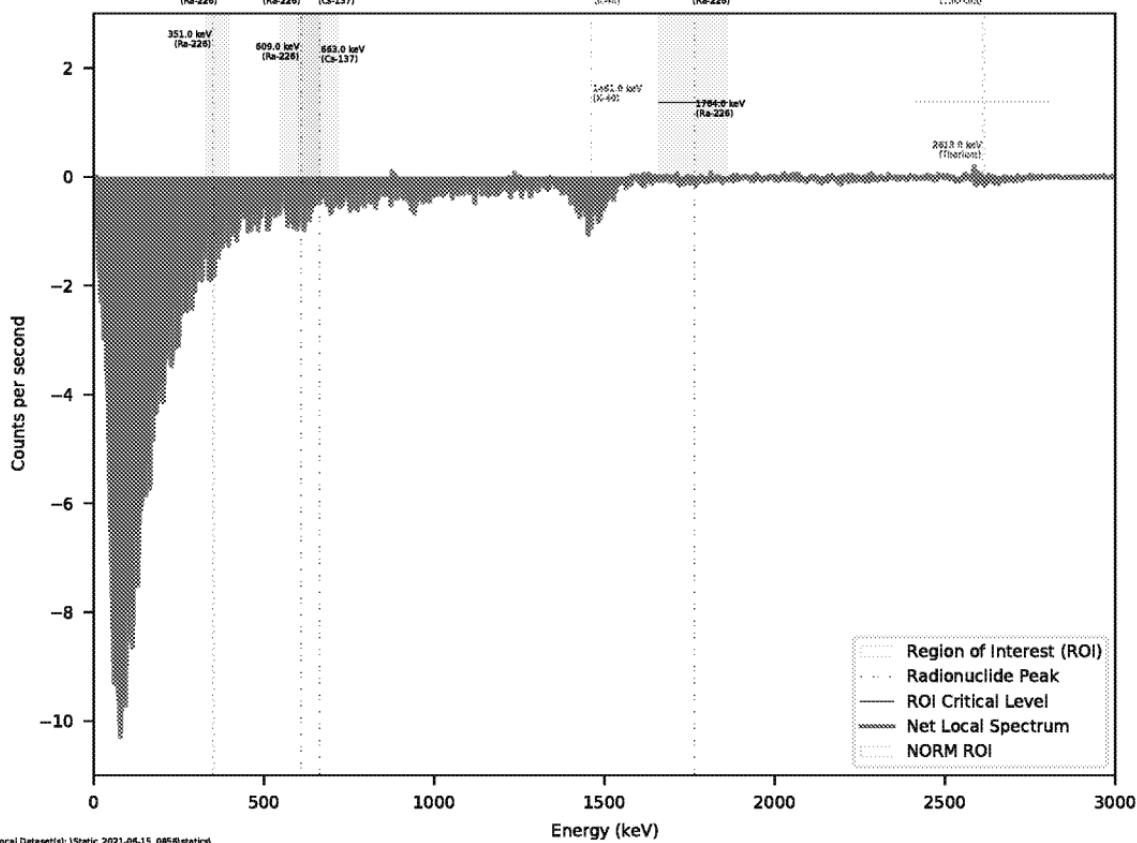
## Net Gamma Spectrum, Static Location: 8

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## Net Gamma Spectrum, Static Location: 9

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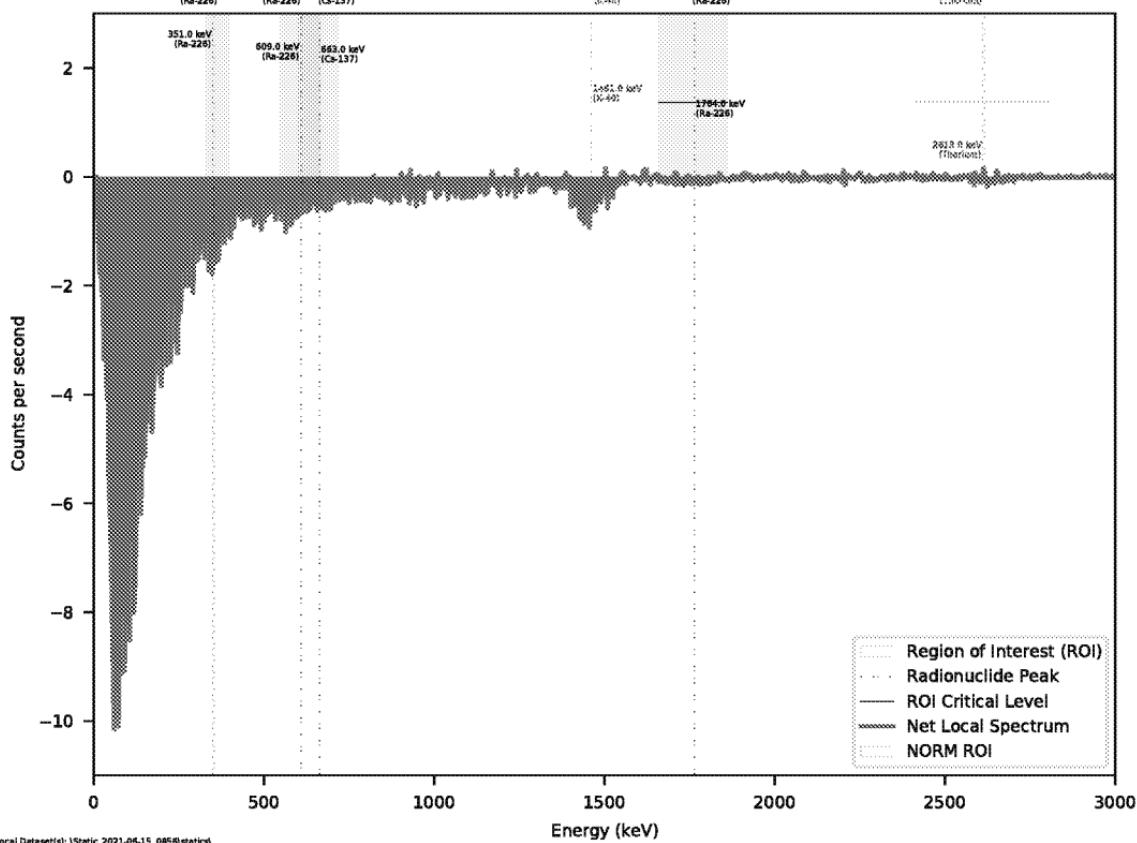
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 Background Dataset(s): RS2\_SoilNBA\_Static.csv

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ED\_006360A\_00000147-00022

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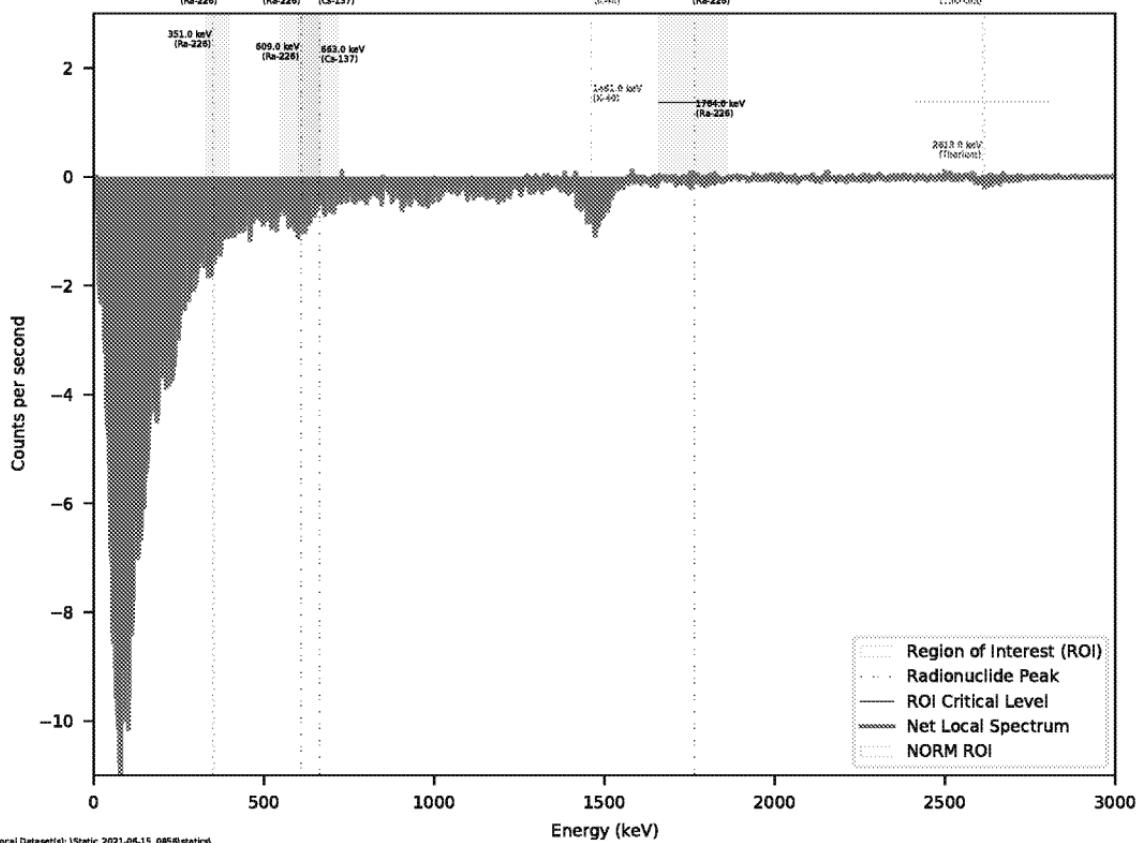
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ED\_006360A\_00000147-00023

## Net Gamma Spectrum, Static Location: 11

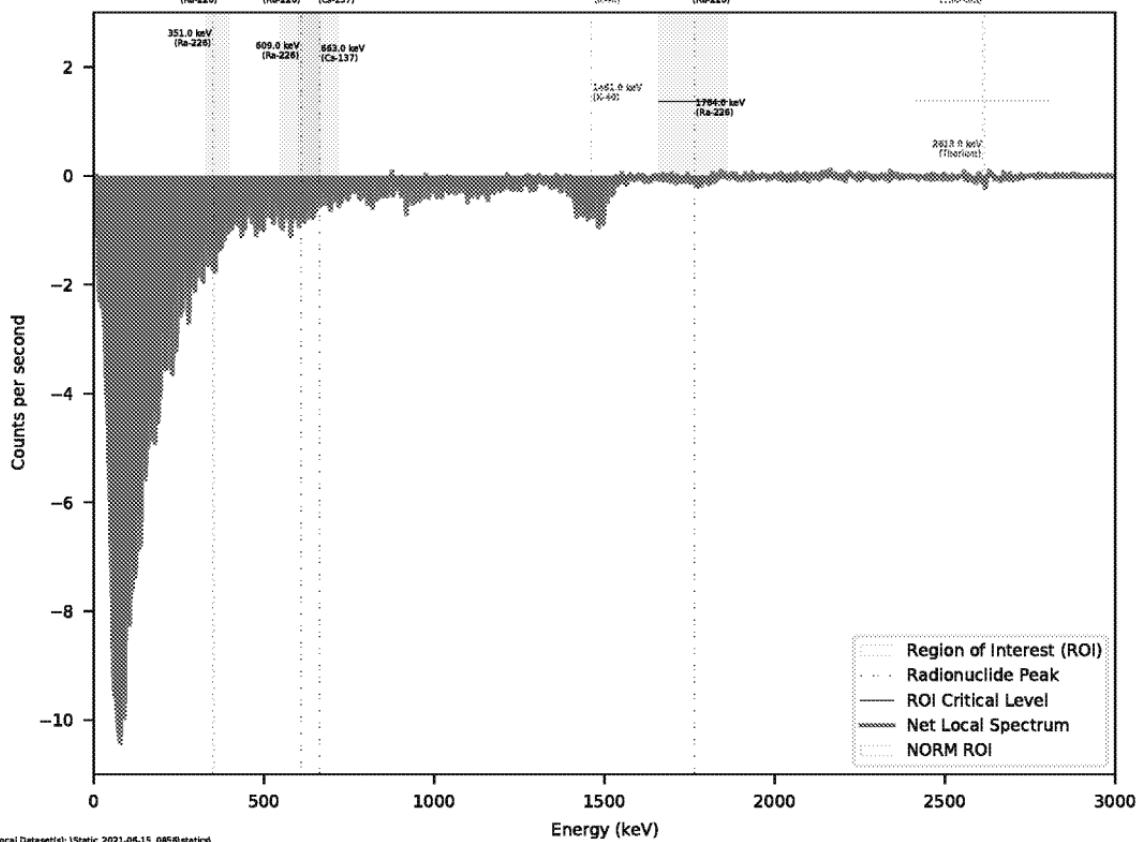
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ED\_006360A\_00000147-00024

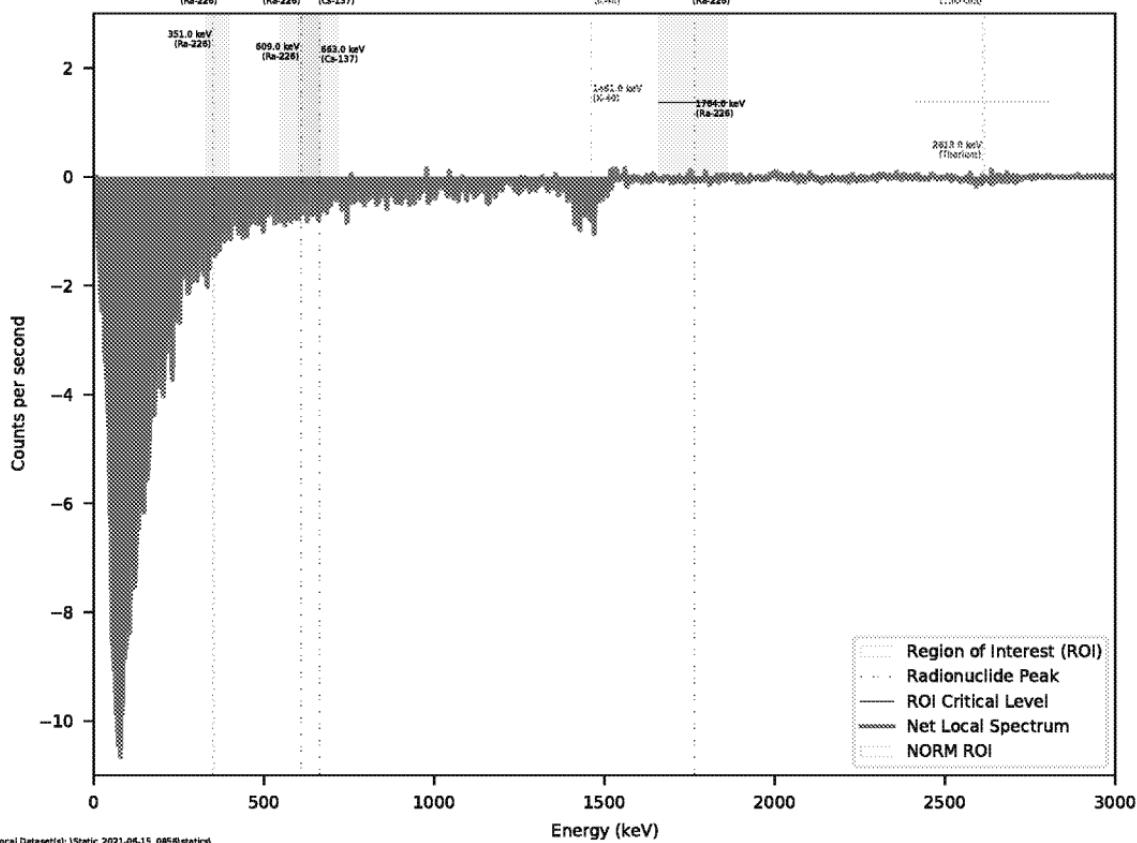
## Net Gamma Spectrum, Static Location: 12

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## Net Gamma Spectrum, Static Location: 13

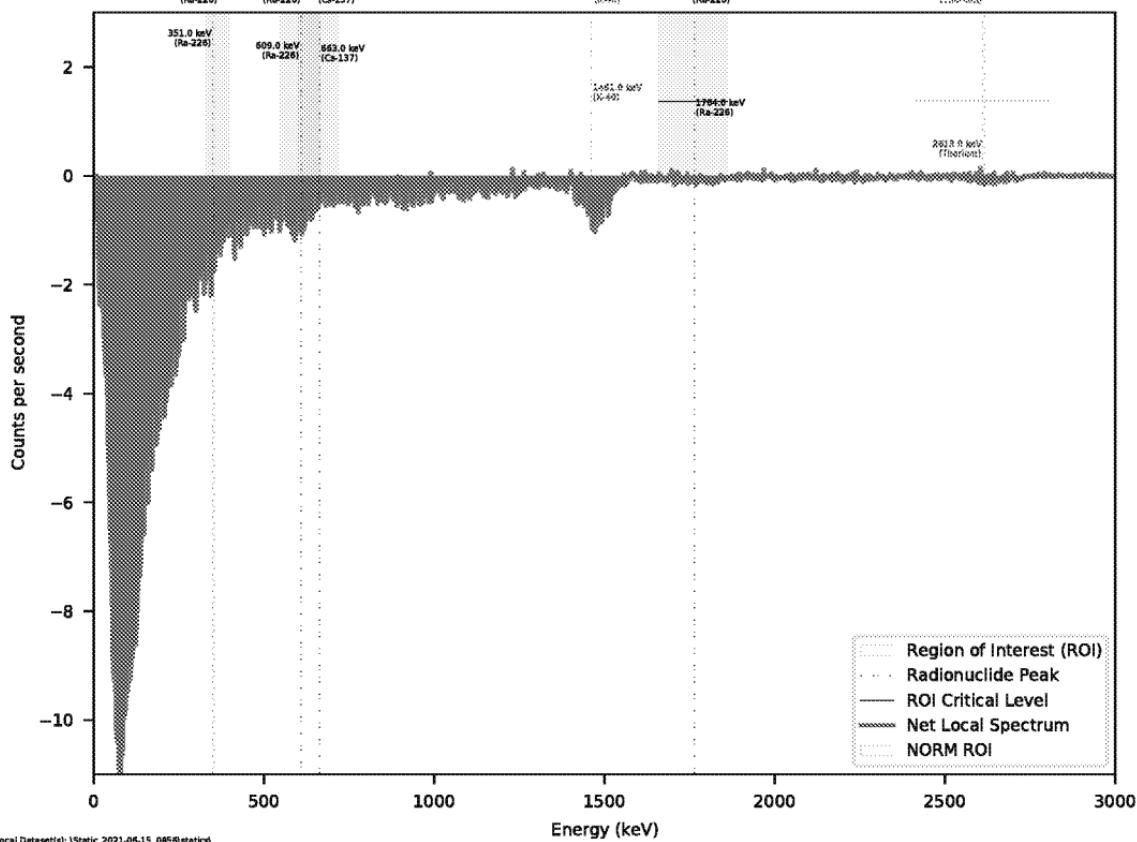
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# Net Gamma Spectrum, Static Location: 14

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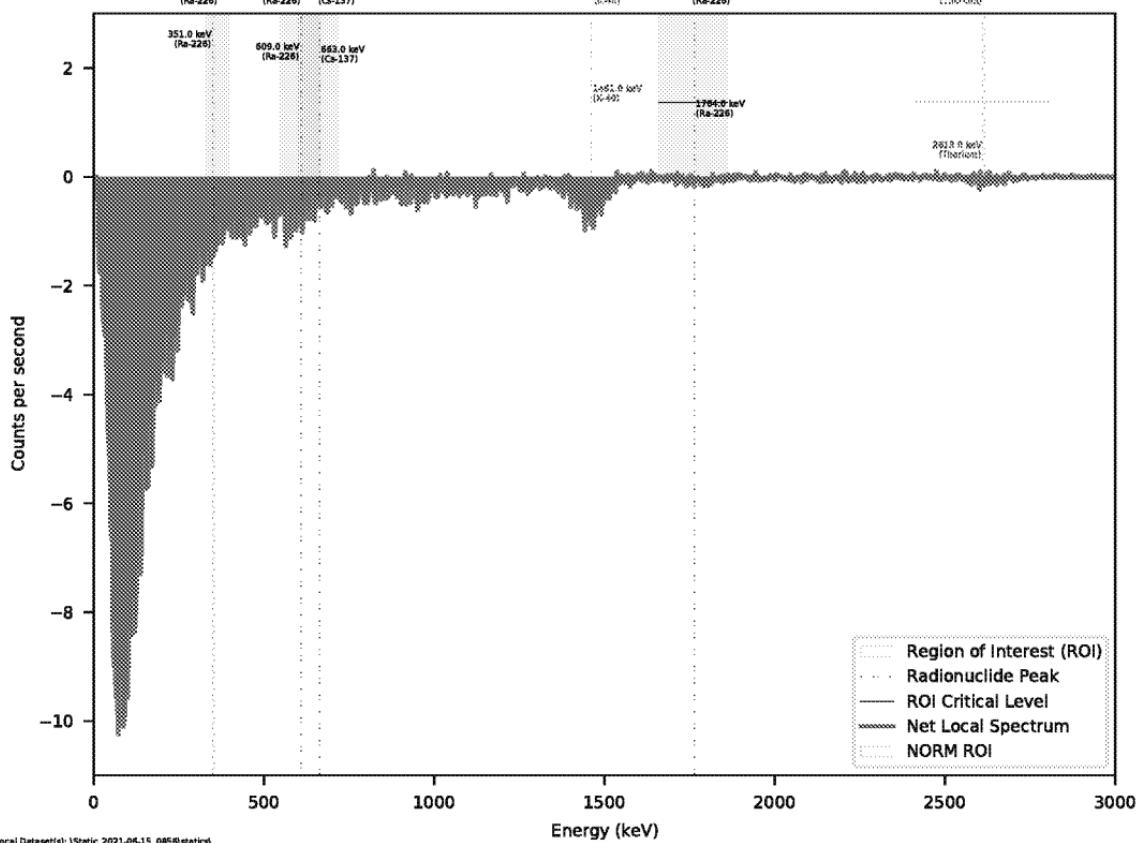


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## Net Gamma Spectrum, Static Location: 15

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 Background Dataset(s): RS2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36609990468751, 37.724749315625

ED\_006360A\_00000147-00028



## Environment Testing America

### ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-42415-1  
Laboratory Sample Delivery Group: GJ46599755  
Client Project/Site: HPNS-Parcel G 501197

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

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Authorized for release by:  
7/31/2021 1:12:36 PM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
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*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Job ID: 160-42415-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

Narrative

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-42415-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### RECEIPT

The samples were received on 06/14/2021; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 27.1 C.

# Case Narrative

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

## Job ID: 160-42415-1 (Continued)

### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

**Receipt Exceptions:** The container label for the following sample did not match the information listed on the Chain-of-Custody (COC): HPPG-F-074 (160-42415-2). The container labels list HPPG-F-073, while the COC lists HPPG-F-074. The client container label has a collection time of 1400, which matches the COC collection information. The sample was logged and labeled according to the COC information.

The paint can for sample HPPG-SFU-TU100A-006 (160-42415-8) broke open while on the ball mill. All sample volume was lost due to container failure. The client was contacted and will recollect the sample.

### STRONTIUM-90 (GFPC)

Samples HPPG-SFU-TU100A-001 (160-42415-3), HPPG-SFU-TU100A-011 (160-42415-13) and HPPG-SFU-TU100A-021 (160-42415-23) were analyzed for Strontium-90 (GFPC) in accordance with EPA 905. The samples were dried on 06/15/2021, prepared on 06/30/2021 and 07/20/2021 and analyzed on 07/12/2021 and 07/29/2021.

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-516657/23-A), (MB 160-519394/23-A).

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples HPPG-F-073 (160-42415-1), HPPG-F-074 (160-42415-2), HPPG-SFU-TU100A-001 (160-42415-3), HPPG-SFU-TU100A-002 (160-42415-4), HPPG-SFU-TU100A-003 (160-42415-5), HPPG-SFU-TU100A-004 (160-42415-6), HPPG-SFU-TU100A-005 (160-42415-7), HPPG-SFU-TU100A-007 (160-42415-9), HPPG-SFU-TU100A-008 (160-42415-10), HPPG-SFU-TU100A-009 (160-42415-11), HPPG-SFU-TU100A-010 (160-42415-12), HPPG-SFU-TU100A-011 (160-42415-13), HPPG-SFU-TU100A-012 (160-42415-14), HPPG-SFU-TU100A-013 (160-42415-15), HPPG-SFU-TU100A-014 (160-42415-16), HPPG-SFU-TU100A-015 (160-42415-17), HPPG-SFU-TU100A-016 (160-42415-18), HPPG-SFU-TU100A-017 (160-42415-19), HPPG-SFU-TU100A-018 (160-42415-20), HPPG-SFU-TU100A-019 (160-42415-21), HPPG-SFU-TU100A-020 (160-42415-22), HPPG-SFU-TU100A-021 (160-42415-23), HPPG-SFU-TU100A-022 (160-42415-24), HPPG-SFU-TU100A-023 (160-42415-25), HPPG-SFU-TU100A-024 (160-42415-26) and HPPG-SFU-TU100A-025 (160-42415-27) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 06/15/2021, prepared on 06/17/2021 and analyzed on 07/08/2021, 07/09/2021 and 07/10/2021.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

#### Inferred from      Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

## Case Narrative

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

### Job ID: 160-42415-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-514699/1-A), (MB 160-514709/1-A), (MB 160-514714/1-A), (MB 160-514701/1-A)

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline. HPPG-F-074 (160-42415-2)

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

HPPG-SFU-TU100A-012 (160-42415-14), HPPG-SFU-TU100A-014 (160-42415-16), HPPG-SFU-TU100A-016 (160-42415-18) and HPPG-SFU-TU100A-019 (160-42415-21)

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU for Pb-210: HPPG-SFU-TU100A-008 (160-42415-10). This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# CHAIN OF CUSTODY

APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy

Sample Lead: Rizzo, Trevor

Sample Tech(s): John Naumann  
Stacy Hatch

Ref. Document # 501197RSY-068

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Page 1 of 4

Project Number: 501197 Project Name: Hunters Point Naval Shipyard: Parcel G Remedial Action Project Location: San Francisco, CA Purchase Order #: 1159058 Shipment/Pickup Date: 6/10/2021 Waybill Number: 4957-0225 9272 Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046				Analysis Requested				
				 160-42415 Chain of Custody				
Lab Contact Name/ph #				Gamma Spec (EPA 901.1 M) - Full 21 day ingrowth gamma Strontium-90 (EPA 905 MOD)				
						Dose Rate uR/Hr	Evidence Bag ID	Comment
				Preservatives (water)				
				Preservatives (soil)				
Sample ID	Date	Time	Method	Matrix	# of Containers	Container Type		
HPPG-F-073	6/10/2021	13:11	G	SO	1	16 oz. plastic jar	X	
HPPG-F-074	6/10/2021	14:00	G	SO	1	16 oz. plastic jar	X	
HPPG-SFU-TU100A-001	6/10/2021	12:43	G	SO	1	16 oz. plastic jar	X	
HPPG-SFU-TU100A-002	6/10/2021	12:51	G	SO	1	16 oz. plastic jar	X	
HPPG-SFU-TU100A-003	6/10/2021	13:00	G	SO	1	16 oz. plastic jar	X	
HPPG-SFU-TU100A-004	6/10/2021	13:00	G	SO	1	16 oz. plastic jar	X	
HPPG-SFU-TU100A-005	6/10/2021	13:00	G	SO	1	16 oz. plastic jar	X	
HPPG-SFU-TU100A-006	6/10/2021	13:10	G	SO	1	16 oz. plastic jar	X	

## Special Instructions:

21 day ingrowth results only

Turnaround Time:  3-day  10-Day  28-day  Other  Level of QC Required:  I  II  III  Project Specific

Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening

Relinquished By: Relinquisher Signature: Relinquish Date Time: Received By: Received Signature: Receive Date Time:

Rizzo, Trevor		06/10/2021 16:39	SHIPPEDTOLAB		
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FED EX

\*\*\* Last 3 transfers shown above - Complete list of transfers on last page \*\*\*

  
 Michael Koninkings
   
 6/14/2021
   
 08:45



APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520

## CHAIN OF CUSTODY

Ref. Document # 501197RSY-068

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Page 2 of 4

Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy  
City: Concord, CA 94520

Sample Lead: Rizzo, Trevor

Sample Tech(s): John Naumann  
Stacy Hatch

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Sample ID	Collection Information				Matrix	# of Containers	Analysis Requested						Dose Rate uR/Hr	Evidence Bag ID	Comment	
	Date	Time	Method	Preservatives			Preservatives (water)	Preservatives (soil)	Container Type	Shallow-30 (EPA 905 M00)	Gamma Spec (EPA 901.1 M) - Full 21 day in growth gamma	Shallow-30 (EPA 905 M00)	Gamma Spec (EPA 901.1 M) - Full 21 day in growth gamma			
HPPG-SFU-TU100A-007	6/10/2021	13:09	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-008	6/10/2021	13:12	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-009	6/10/2021	13:12	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-010	6/10/2021	13:11	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-011	6/10/2021	13:13	G	SO	1	1	16 oz. plastic jar		X	X				4	GJ46599755	
HPPG-SFU-TU100A-012	6/10/2021	13:28	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-013	6/10/2021	13:25	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-014	6/10/2021	13:18	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-015	6/10/2021	13:19	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-016	6/10/2021	13:24	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-017	6/10/2021	13:27	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-018	6/10/2021	13:31	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-019	6/10/2021	13:35	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-020	6/10/2021	13:39	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-021	6/10/2021	13:43	G	SO	1	1	16 oz. plastic jar		X	X				4	GJ46599755	
HPPG-SFU-TU100A-022	6/10/2021	13:44	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	
HPPG-SFU-TU100A-023	6/10/2021	13:45	G	SO	1	1	16 oz. plastic jar		X					4	GJ46599755	

7/31/2021



ED\_006360A\_00000147-00035



# CHAIN OF CUSTODY

APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520

Project Manager: Lisa Bercik  
Phone #: (619)213-3389

Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy  
City: Concord, CA 94520

Sample Lead: Rizzo, Trevor

Sample Tech(s): John Naumann  
Stacy Hatch

Project Number: 501197

Hunters Point Naval Shipyard: Parcel  
Project Name: G Remedial Action

Project Location: San Francisco, CA

Purchase Order #: 1159058

Shipment/Pickup Date: 6/10/2021

Waybill Number: 4957 0225 9272

Test America (St. Louis Lab)  
13715 Rider Trail North  
Earth City, MO 63046

Lab Destination: Rhoeda Ridenbower (314)298-8566

Rhoeda Ridenbower (314)298-8566

Analysis Requested

Gamma Spec (EPA 901.1 M) - Full 21 day in growth gamma

Strontium-90 (EPA 905 MOD)

Dose Rate  
uR/Hr

Evidence Bag  
ID

Comment

Lab Contact Name/ph #

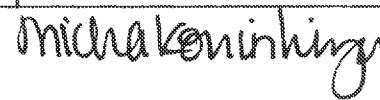
Matrix	# of Containers	Collection Information		Preservatives (water)	Preservatives (soil)	Container Type	Dose Rate uR/Hr	Evidence Bag ID	Comment
		Date	Time						
		Sample ID	Method						
		HPPG-SFU-TU100A-024	6/10/2021	13:57	G	SO	1	16 oz. plastic jar	X
		HPPG-SFU-TU100A-025	6/10/2021	14:00	G	SO	1	16 oz. plastic jar	X



# All Transfers for COC 501197RSY-068

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Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Rizzo, Trevor		06/10/2021 16:39	SHIPPEDTOLAB	FED EX	 6/14/2021 08:45

FED EX



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-42415-1  
SDG Number: GJ46599755**Login Number:** 42415**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Worthington, Sierra M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

## Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

Method	Method Description	Protocol	Laboratory
905	Strontium-90 (GFPC)	EPA	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-7	Preparation, Digestion/Precipitate Separation (7-Day In-Growth)	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

### Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

### Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-42415-1	HPPG-F-073	Solid	06/10/21 13:11	06/14/21 08:45
160-42415-2	HPPG-F-074	Solid	06/10/21 14:00	06/14/21 08:45
160-42415-3	HPPG-SFU-TU100A-001	Solid	06/10/21 12:43	06/14/21 08:45
160-42415-4	HPPG-SFU-TU100A-002	Solid	06/10/21 12:51	06/14/21 08:45
160-42415-5	HPPG-SFU-TU100A-003	Solid	06/10/21 13:00	06/14/21 08:45
160-42415-6	HPPG-SFU-TU100A-004	Solid	06/10/21 13:00	06/14/21 08:45
160-42415-7	HPPG-SFU-TU100A-005	Solid	06/10/21 13:00	06/14/21 08:45
160-42415-9	HPPG-SFU-TU100A-007	Solid	06/10/21 13:09	06/14/21 08:45
160-42415-10	HPPG-SFU-TU100A-008	Solid	06/10/21 13:12	06/14/21 08:45
160-42415-11	HPPG-SFU-TU100A-009	Solid	06/10/21 13:12	06/14/21 08:45
160-42415-12	HPPG-SFU-TU100A-010	Solid	06/10/21 13:11	06/14/21 08:45
160-42415-13	HPPG-SFU-TU100A-011	Solid	06/10/21 13:13	06/14/21 08:45
160-42415-14	HPPG-SFU-TU100A-012	Solid	06/10/21 13:28	06/14/21 08:45
160-42415-15	HPPG-SFU-TU100A-013	Solid	06/10/21 13:25	06/14/21 08:45
160-42415-16	HPPG-SFU-TU100A-014	Solid	06/10/21 13:18	06/14/21 08:45
160-42415-17	HPPG-SFU-TU100A-015	Solid	06/10/21 13:19	06/14/21 08:45
160-42415-18	HPPG-SFU-TU100A-016	Solid	06/10/21 13:24	06/14/21 08:45
160-42415-19	HPPG-SFU-TU100A-017	Solid	06/10/21 13:27	06/14/21 08:45
160-42415-20	HPPG-SFU-TU100A-018	Solid	06/10/21 13:31	06/14/21 08:45
160-42415-21	HPPG-SFU-TU100A-019	Solid	06/10/21 13:35	06/14/21 08:45
160-42415-22	HPPG-SFU-TU100A-020	Solid	06/10/21 13:39	06/14/21 08:45
160-42415-23	HPPG-SFU-TU100A-021	Solid	06/10/21 13:43	06/14/21 08:45
160-42415-24	HPPG-SFU-TU100A-022	Solid	06/10/21 13:44	06/14/21 08:45
160-42415-25	HPPG-SFU-TU100A-023	Solid	06/10/21 13:45	06/14/21 08:45
160-42415-26	HPPG-SFU-TU100A-024	Solid	06/10/21 13:57	06/14/21 08:45
160-42415-27	HPPG-SFU-TU100A-025	Solid	06/10/21 14:00	06/14/21 08:45

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-F-073**  
Date Collected: 06/10/21 13:11  
Date Received: 06/14/21 08:45

**Lab Sample ID: 160-42415-1**  
Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.320		0.109	0.114		0.0208	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Actinium-227	-0.302	U	0.576	0.577		0.333	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Americium-241	0.0492	U	0.110	0.110		0.0887	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Bismuth-212	0.264	U	0.491	0.492		0.378	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Bismuth-214</b>	<b>0.339</b>		0.0908	0.0974		0.0336	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Cesium-137	-0.0268	U	0.0600	0.0600	0.0700	0.0476	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Lead-210</b>	<b>0.722</b>		0.782	0.787		0.591	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Lead-212</b>	<b>0.292</b>		0.0602	0.0711		0.0258	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Lead-214</b>	<b>0.318</b>		0.0871	0.0932		0.0453	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Potassium-40</b>	<b>6.72</b>		0.972	1.19		0.0819	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Protactinium-231	0.494	U	1.38	1.38		1.51	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Protactinium-234	0.0252	U	0.0406	0.0407		0.180	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Radium-226</b>	<b>0.339</b>		0.0908	0.0974	0.200	0.0336	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Radium-228</b>	<b>0.320</b>		0.109	0.114		0.0208	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Thallium-208</b>	<b>0.0730</b>		0.0628	0.0633		0.0304	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Thorium 228</b>	<b>0.292</b>		0.0602	0.0711		0.0258	pCi/g	06/17/21 14:30	07/10/21 08:36	1
<b>Thorium-232</b>	<b>0.320</b>		0.109	0.114		0.0208	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thorium-234	0.000	U	0.206	0.206		0.700	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Uranium-235	0.000	U	0.137	0.137		0.306	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Uranium-238	0.000	U	0.206	0.206		0.700	pCi/g	06/17/21 14:30	07/10/21 08:36	1

**Client Sample ID: HPPG-F-074**

Date Collected: 06/10/21 14:00  
Date Received: 06/14/21 08:45

**Lab Sample ID: 160-42415-2**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.400		0.180	0.185		0.151	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Actinium-227	0.126	U	0.278	0.278		0.382	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Americium-241	0.0348	U	0.126	0.126		0.0859	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Bismuth-212	0.00832	U	0.869	0.869		0.714	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Bismuth-214</b>	<b>0.408</b>		0.121	0.128		0.0350	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Cesium-137	-0.0000632	U	0.103	0.103	0.0700	0.0851	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Lead-210</b>	<b>1.15</b>		1.10	1.11		0.717	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Lead-212</b>	<b>0.389</b>		0.0973	0.110		0.0495	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Lead-214</b>	<b>0.481</b>		0.120	0.130		0.0561	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Potassium-40</b>	<b>8.28</b>		1.71	1.91		0.460	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Protactinium-231	0.000	U	0.434	0.434		2.13	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Protactinium-234	0.0328	U	0.0454	0.0455		0.188	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Radium-226</b>	<b>0.408</b>		0.121	0.128	0.200	0.0350	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Radium-228</b>	<b>0.400</b>		0.180	0.185		0.151	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Thallium-208</b>	<b>0.126</b>		0.0541	0.0556		0.0182	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Thorium 228</b>	<b>0.389</b>		0.0973	0.110		0.0495	pCi/g	06/17/21 14:30	07/10/21 07:52	1
<b>Thorium-232</b>	<b>0.400</b>		0.180	0.185		0.151	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Thorium-234	0.0355	U	0.483	0.483		0.393	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Uranium-235	-0.168	U	0.260	0.261		0.304	pCi/g	06/17/21 14:30	07/10/21 07:52	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-F-074**

**Lab Sample ID: 160-42415-2**

Date Collected: 06/10/21 14:00

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	0.0355	U	0.483	0.483		0.393	pCi/g	06/17/21 14:30	07/10/21 07:52	1

**Client Sample ID: HPPG-SFU-TU100A-001**

**Lab Sample ID: 160-42415-3**

Date Collected: 06/10/21 12:43

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.0736	U	0.180	0.180	0.331	0.142	pCi/g	07/20/21 12:00	07/29/21 14:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	88.0		40 - 110					07/20/21 12:00	07/29/21 14:11	1
Y Carrier	90.5		40 - 110					07/20/21 12:00	07/29/21 14:11	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.152		0.191	0.192		0.141	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Actinium-227	-0.0807	U	0.526	0.526		0.310	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Americium-241	0.0314	U	0.108	0.108		0.0740	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Bismuth-212	-0.228	U	0.727	0.728		0.694	pCi/g	06/17/21 11:56	07/08/21 15:28	1
<b>Bismuth-214</b>	<b>0.208</b>		0.0856	0.0883		0.0327	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Cesium-137	0.00356	U	0.0509	0.0509	0.0700	0.0411	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Lead-210	0.253	U	0.872	0.873		0.642	pCi/g	06/17/21 11:56	07/08/21 15:28	1
<b>Lead-212</b>	<b>0.318</b>		0.0792	0.0892		0.0348	pCi/g	06/17/21 11:56	07/08/21 15:28	1
<b>Lead-214</b>	<b>0.317</b>		0.0824	0.0888		0.0410	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Potassium-40	6.20		1.30	1.45		0.253	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Protactinium-231	0.000	U	0.405	0.405		1.85	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Protactinium-234	-0.0827	U	0.147	0.147		0.172	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Radium-226	0.208		0.0856	0.0883	0.200	0.0327	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Radium-228	0.152		0.191	0.192		0.141	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Thallium-208	0.130		0.0470	0.0489		0.00878	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Thorium 228	0.318		0.0792	0.0892		0.0348	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Thorium-232	0.152		0.191	0.192		0.141	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Thorium-234	0.443		0.411	0.414		0.318	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Uranium-235	-0.0232	U	0.0335	0.0336		0.285	pCi/g	06/17/21 11:56	07/08/21 15:28	1
Uranium-238	0.443		0.411	0.414		0.318	pCi/g	06/17/21 11:56	07/08/21 15:28	1

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# Client Sample Results

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 Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-42415-1  
 SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-002**
**Lab Sample ID: 160-42415-4**

Date Collected: 06/10/21 12:51

Matrix: Solid

Date Received: 06/14/21 08:45

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.592		0.131	0.144		0.0308	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Actinium-227	0.455		0.450	0.452		0.252	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Americium-241	-0.00706	U	0.155	0.155		0.127	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Bismuth-212	-0.519	U	0.900	0.902		0.699	pCi/g	06/17/21 11:56	07/08/21 16:16	1
<b>Bismuth-214</b>	<b>0.567</b>		0.144	0.155		0.0534	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Cesium-137	-0.0453	U	0.0778	0.0779	0.0700	0.0606	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Lead-210	0.842	U	1.27	1.28		0.978	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Lead-212	0.493		0.102	0.115		0.0517	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Lead-214	0.512		0.145	0.154		0.0606	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Potassium-40	8.12		1.34	1.57		0.286	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Protactinium-231	-0.0000002	U	2.91	2.91		2.40	pCi/g	06/17/21 11:56	07/08/21 16:16	1
			24							
Protactinium-234	-0.0177	U	0.109	0.109		0.266	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Radium-226	0.567		0.144	0.155	0.200	0.0534	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Radium-228	0.592		0.131	0.144		0.0308	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Thallium-208	0.200		0.0632	0.0664		0.0202	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Thorium 228	0.493		0.102	0.115		0.0517	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Thorium-232	0.592		0.131	0.144		0.0308	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Thorium-234	0.413	U	0.530	0.532		0.424	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Uranium-235	-0.202	U	0.588	0.589		0.479	pCi/g	06/17/21 11:56	07/08/21 16:16	1
Uranium-238	0.413	U	0.530	0.532		0.424	pCi/g	06/17/21 11:56	07/08/21 16:16	1

**Client Sample ID: HPPG-SFU-TU100A-003**
**Lab Sample ID: 160-42415-5**

Date Collected: 06/10/21 13:00

Matrix: Solid

Date Received: 06/14/21 08:45

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.227		0.115	0.117		0.108	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Actinium-227	0.0530	U	0.133	0.133		0.310	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Americium-241	-0.0596	U	0.127	0.127		0.0774	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Bismuth-212	0.170	U	0.313	0.314		0.229	pCi/g	06/17/21 11:56	07/08/21 16:18	1
<b>Bismuth-214</b>	<b>0.246</b>		0.0895	0.0931		0.0400	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Cesium-137	-0.0383	U	0.0579	0.0580	0.0700	0.0449	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Lead-210	-0.00580	U	1.04	1.04		0.855	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Lead-212	0.0384	U	0.108	0.108		0.0877	pCi/g	06/17/21 11:56	07/08/21 16:18	1
<b>Lead-214</b>	<b>0.313</b>		0.0900	0.0957		0.0394	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Potassium-40	8.27		1.10	1.39		0.0856	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Protactinium-231	0.275	U	1.08	1.08		1.70	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Protactinium-234	0.0964	U	0.0515	0.0525		0.195	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Radium-226	0.246		0.0895	0.0931	0.200	0.0400	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Radium-228	0.227		0.115	0.117		0.108	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Thallium-208	0.128		0.0389	0.0411		0.0129	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Thorium 228	0.0384	U	0.108	0.108		0.0877	pCi/g	06/17/21 11:56	07/08/21 16:18	1
<b>Thorium-232</b>	<b>0.227</b>		0.115	0.117		0.108	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Thorium-234	-0.293	U	0.847	0.848		0.690	pCi/g	06/17/21 11:56	07/08/21 16:18	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-003**

**Lab Sample ID: 160-42415-5**

Date Collected: 06/10/21 13:00

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-235	0.000	U	0.134	0.134		0.351	pCi/g	06/17/21 11:56	07/08/21 16:18	1
Uranium-238	-0.293	U	0.847	0.848		0.690	pCi/g	06/17/21 11:56	07/08/21 16:18	1

**Client Sample ID: HPPG-SFU-TU100A-004**

**Lab Sample ID: 160-42415-6**

Date Collected: 06/10/21 13:00

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-228	0.169		0.0910	0.0926		0.159	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Actinium-227	-0.109	U	0.386	0.386		0.286	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Americium-241	-0.0363	U	0.0888	0.0889		0.0675	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Bismuth-212	0.314	U	0.918	0.918		0.727	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Bismuth-214	0.154		0.111	0.112		0.136	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Cesium-137	-0.0477	U	0.0658	0.0659	0.0700	0.0543	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Lead-210	0.271	U	1.02	1.02		0.716	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Lead-212	0.154		0.0575	0.0609		0.0254	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Lead-214	0.216		0.0762	0.0794		0.0458	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Potassium-40	4.18		1.07	1.16		0.248	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Protactinium-231	0.488	U	1.49	1.50		1.64	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Protactinium-234	0.0611	U	0.138	0.138		0.130	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Radium-226	0.154		0.111	0.112	0.200	0.136	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Radium-228	0.169		0.0910	0.0926		0.159	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Thallium-208	0.0933		0.0480	0.0490		0.0187	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Thorium-228	0.154		0.0575	0.0609		0.0254	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Thorium-232	0.169		0.0910	0.0926		0.159	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Thorium-234	-0.203	U	0.711	0.712		0.593	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Uranium-235	0.0985	U	0.204	0.204		0.188	pCi/g	06/17/21 11:56	07/08/21 17:23	1
Uranium-238	-0.203	U	0.711	0.712		0.593	pCi/g	06/17/21 11:56	07/08/21 17:23	1

**Client Sample ID: HPPG-SFU-TU100A-005**

**Lab Sample ID: 160-42415-7**

Date Collected: 06/10/21 13:00

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-228	0.0958	U	0.194	0.195		0.197	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Actinium-227	-0.412	U	0.787	0.788		0.474	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Americium-241	-0.0675	U	0.175	0.175		0.141	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Bismuth-212	-0.116	U	0.912	0.912		0.741	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Bismuth-214	0.471		0.157	0.166		0.0633	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Cesium-137	0.00288	U	0.0586	0.0586	0.0700	0.0479	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Lead-210	-0.875	U	1.98	1.99		1.66	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Lead-212	0.311		0.0956	0.102		0.0554	pCi/g	06/17/21 14:30	07/10/21 08:34	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-005**

**Lab Sample ID: 160-42415-7**

Date Collected: 06/10/21 13:00

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Lead-214	0.364		0.123	0.130		0.0613	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Potassium-40	9.03		1.52	1.84		0.340	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Protactinium-231	0.748	U	2.27	2.27		1.83	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Protactinium-234	-0.0289	U	0.0647	0.0648		0.283	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Radium-226	0.471		0.157	0.166	0.200	0.0633	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Radium-228	0.0958	U	0.194	0.195		0.197	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Thallium-208	0.0846		0.0800	0.0806		0.0544	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Thorium 228	0.311		0.0956	0.102		0.0554	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Thorium-232	0.0958	U	0.194	0.195		0.197	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Thorium-234	0.848		0.652	0.660		0.448	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Uranium-235	-0.0453	U	0.0617	0.0619		0.535	pCi/g	06/17/21 14:30	07/10/21 08:34	1
Uranium-238	0.848		0.652	0.660		0.448	pCi/g	06/17/21 14:30	07/10/21 08:34	1

**Client Sample ID: HPPG-SFU-TU100A-007**

**Lab Sample ID: 160-42415-9**

Date Collected: 06/10/21 13:09

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.208		0.179	0.181		0.0939	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Actinium-227	-0.294	U	0.572	0.573		0.343	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Americium-241	0.0321	U	0.165	0.165		0.135	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Bismuth-212	0.316	U	0.588	0.588		0.446	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Bismuth-214	0.395		0.112	0.119		0.0443	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Cesium-137	0.00573	U	0.0738	0.0738	0.0700	0.0603	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Lead-210	1.32		1.59	1.60		0.986	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Lead-212	0.307		0.0814	0.0875		0.0427	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Lead-214	0.253		0.0991	0.102		0.0510	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Potassium-40	6.58		1.19	1.36		0.275	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Protactinium-231	0.386	U	1.30	1.30		2.05	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Protactinium-234	-0.0962	U	0.289	0.290		0.235	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Radium-226	0.395		0.112	0.119	0.200	0.0443	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Radium-228	0.208		0.179	0.181		0.0939	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Thallium-208	0.114		0.0600	0.0611		0.0266	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Thorium 228	0.307		0.0814	0.0875		0.0427	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Thorium-232	0.208		0.179	0.181		0.0939	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Thorium-234	0.587		0.548	0.552		0.407	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Uranium-235	-0.198	U	0.582	0.582		0.474	pCi/g	06/17/21 11:56	07/08/21 17:28	1
Uranium-238	0.587		0.548	0.552		0.407	pCi/g	06/17/21 11:56	07/08/21 17:28	1

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# Client Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-008**

**Lab Sample ID: 160-42415-10**

Date Collected: 06/10/21 13:12  
Date Received: 06/14/21 08:45

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.0992	U	0.103	0.104		0.198	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Actinium-227	0.200	U	0.394	0.395		0.353	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Americium-241	0.0664	U	0.159	0.160		0.128	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Bismuth-212	-0.613	U	1.25	1.26		0.992	pCi/g	06/17/21 11:56	07/08/21 15:26	1
<b>Bismuth-214</b>	<b>0.260</b>		0.133	0.136		0.0590	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Cesium-137	0.0155	U	0.0825	0.0825	0.0700	0.0666	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Lead-210	-2.59	U	1.50	1.54		1.81	pCi/g	06/17/21 11:56	07/08/21 15:26	1
<b>Lead-212</b>	<b>0.264</b>		0.101	0.105		0.0647	pCi/g	06/17/21 11:56	07/08/21 15:26	1
<b>Lead-214</b>	<b>0.437</b>		0.129	0.139		0.0511	pCi/g	06/17/21 11:56	07/08/21 15:26	1
<b>Potassium-40</b>	<b>7.15</b>		1.37	1.60		0.342	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Protactinium-231	0.000	U	0.673	0.673		2.31	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Protactinium-234	0.0993	U	0.0654	0.0664		0.273	pCi/g	06/17/21 11:56	07/08/21 15:26	1
<b>Radium-226</b>	<b>0.260</b>		0.133	0.136	0.200	0.0590	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Radium-228	0.0992	U	0.103	0.104		0.198	pCi/g	06/17/21 11:56	07/08/21 15:26	1
<b>Thallium-208</b>	<b>0.121</b>		0.104	0.105		0.0445	pCi/g	06/17/21 11:56	07/08/21 15:26	1
<b>Thorium 228</b>	<b>0.264</b>		0.101	0.105		0.0647	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Thorium-232	0.0992	U	0.103	0.104		0.198	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Thorium-234	-0.186	U	0.999	0.999		0.827	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Uranium-235	-0.00404	U	0.553	0.553		0.456	pCi/g	06/17/21 11:56	07/08/21 15:26	1
Uranium-238	-0.186	U	0.999	0.999		0.827	pCi/g	06/17/21 11:56	07/08/21 15:26	1

**Client Sample ID: HPPG-SFU-TU100A-009**

**Lab Sample ID: 160-42415-11**

Date Collected: 06/10/21 13:12  
Date Received: 06/14/21 08:45

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.130		0.201	0.201		0.112	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Actinium-227	0.0107	U	0.394	0.394		0.245	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Americium-241	-0.0395	U	0.0859	0.0860		0.0731	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Bismuth-212	0.0321	U	0.601	0.601		0.490	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Bismuth-214</b>	<b>0.507</b>		0.156	0.165		0.0556	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Cesium-137	-0.0116	U	0.0517	0.0517	0.0700	0.0438	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Lead-210	-0.359	U	0.985	0.986		0.729	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Lead-212</b>	<b>0.224</b>		0.0698	0.0756		0.0350	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Lead-214</b>	<b>0.580</b>		0.118	0.133		0.0285	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Potassium-40</b>	<b>4.50</b>		1.10	1.19		0.244	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Protactinium-231	0.000	U	0.124	0.124		1.80	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Protactinium-234	0.0804	U	0.210	0.210		0.118	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Radium-226</b>	<b>0.507</b>		0.156	0.165	0.200	0.0556	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Radium-228</b>	<b>0.130</b>		0.201	0.201		0.112	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Thallium-208</b>	<b>0.0902</b>		0.0432	0.0442		0.0153	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Thorium 228</b>	<b>0.224</b>		0.0698	0.0756		0.0350	pCi/g	06/17/21 11:56	07/08/21 16:10	1
<b>Thorium-232</b>	<b>0.130</b>		0.201	0.201		0.112	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Thorium-234	-0.380	U	0.493	0.495		0.636	pCi/g	06/17/21 11:56	07/08/21 16:10	1
Uranium-235	0.120	U	0.223	0.224		0.182	pCi/g	06/17/21 11:56	07/08/21 16:10	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-009**

**Lab Sample ID: 160-42415-11**

Date Collected: 06/10/21 13:12

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	-0.380	U	0.493	0.495		0.636	pCi/g	06/17/21 11:56	07/08/21 16:10	1

**Client Sample ID: HPPG-SFU-TU100A-010**

**Lab Sample ID: 160-42415-12**

Date Collected: 06/10/21 13:11

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.507		0.218	0.225		0.0754	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Actinium-227	0.118	U	0.160	0.161		0.381	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Americium-241	0.0619	U	0.149	0.149		0.120	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Bismuth-212	0.000	U	0.522	0.522		0.629	pCi/g	06/17/21 11:56	07/08/21 16:14	1
<b>Bismuth-214</b>	<b>0.417</b>		0.161	0.168		0.0703	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Cesium-137	0.00355	U	0.0731	0.0731	0.0700	0.0599	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Lead-210	-0.856	U	2.02	2.02		1.69	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Lead-212	0.0248	U	0.130	0.130		0.105	pCi/g	06/17/21 11:56	07/08/21 16:14	1
<b>Lead-214</b>	<b>0.450</b>		0.146	0.155		0.0815	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Potassium-40	7.82		1.42	1.68		0.340	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Protactinium-231	0.399	U	1.60	1.60		2.52	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Protactinium-234	0.00524	U	0.00980	0.00982		0.312	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Radium-226	0.417		0.161	0.168	0.200	0.0703	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Radium-228	0.507		0.218	0.225		0.0754	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Thallium-208	0.110		0.0864	0.0874		0.0403	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Thorium 228	0.0248	U	0.130	0.130		0.105	pCi/g	06/17/21 11:56	07/08/21 16:14	1
<b>Thorium-232</b>	<b>0.507</b>		0.218	0.225		0.0754	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Thorium-234	-0.908	U	0.788	0.796		0.894	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Uranium-235	0.0930	U	0.190	0.190		0.580	pCi/g	06/17/21 11:56	07/08/21 16:14	1
Uranium-238	-0.908	U	0.788	0.796		0.894	pCi/g	06/17/21 11:56	07/08/21 16:14	1

**Client Sample ID: HPPG-SFU-TU100A-011**

**Lab Sample ID: 160-42415-13**

Date Collected: 06/10/21 13:13

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.181		0.153	0.154	0.331	0.109	pCi/g	07/20/21 12:00	07/29/21 14:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	89.2		40 - 110					07/20/21 12:00	07/29/21 14:11	1
Y Carrier	92.9		40 - 110					07/20/21 12:00	07/29/21 14:11	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-011**

**Lab Sample ID: 160-42415-13**

Date Collected: 06/10/21 13:13  
Date Received: 06/14/21 08:45

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.470		0.111	0.121		0.0208	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Actinium-227	0.149	U	0.376	0.376		0.256	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Americium-241	0.0165	U	0.104	0.104		0.0853	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Bismuth-212	0.163	U	0.521	0.521		0.414	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Bismuth-214</b>	<b>0.240</b>		0.0911	0.0944		0.0435	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Cesium-137	-0.0230	U	0.0558	0.0559	0.0700	0.0296	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Lead-210	-0.648	U	1.40	1.40		1.13	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Lead-212</b>	<b>0.396</b>		0.0699	0.0867		0.0296	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Lead-214</b>	<b>0.288</b>		0.0784	0.0839		0.0310	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Potassium-40</b>	<b>4.84</b>		1.02	1.13		0.285	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Protactinium-231	0.530	U	1.29	1.29		1.42	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Protactinium-234	0.00411	U	0.00691	0.00692		0.196	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Radium-226</b>	<b>0.240</b>		0.0911	0.0944	0.200	0.0435	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Radium-228</b>	<b>0.470</b>		0.111	0.121		0.0208	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Thallium-208</b>	<b>0.102</b>		0.0380	0.0394		0.0139	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Thorium 228</b>	<b>0.396</b>		0.0699	0.0867		0.0296	pCi/g	06/17/21 11:56	07/08/21 17:25	1
<b>Thorium-232</b>	<b>0.470</b>		0.111	0.121		0.0208	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Thorium-234	-0.00937	U	0.0187	0.0187		0.806	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Uranium-235	0.125	U	0.371	0.371		0.302	pCi/g	06/17/21 11:56	07/08/21 17:25	1
Uranium-238	-0.00937	U	0.0187	0.0187		0.806	pCi/g	06/17/21 11:56	07/08/21 17:25	1

**Client Sample ID: HPPG-SFU-TU100A-012**

**Lab Sample ID: 160-42415-14**

Date Collected: 06/10/21 13:28  
Date Received: 06/14/21 08:45

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.161		0.215	0.216		0.141	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Actinium-227	0.143	U	0.560	0.560		0.349	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Americium-241	0.0911	U	0.143	0.143		0.113	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Bismuth-212	0.319	U	0.717	0.718		0.554	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Bismuth-214</b>	<b>0.242</b>		0.119	0.122		0.0598	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Cesium-137	-0.0390	U	0.0510	0.0512	0.0700	0.0780	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Lead-210	-1.43	U	2.15	2.16		1.82	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Lead-212</b>	<b>0.373</b>		0.156	0.162		0.0746	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Lead-214</b>	<b>0.224</b>		0.134	0.136		0.0929	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Potassium-40</b>	<b>6.34</b>		1.41	1.59		0.442	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Protactinium-231	0.000	U	0.412	0.412		2.28	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Protactinium-234	0.157	U	0.207	0.208		0.257	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Radium-226</b>	<b>0.242</b>		0.119	0.122	0.200	0.0598	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Radium-228</b>	<b>0.161</b>		0.215	0.216		0.141	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Thallium-208</b>	<b>0.0973</b>		0.0562	0.0573		0.0271	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Thorium 228</b>	<b>0.373</b>		0.156	0.162		0.0746	pCi/g	06/17/21 11:56	07/08/21 17:27	1
<b>Thorium-232</b>	<b>0.161</b>		0.215	0.216		0.141	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Thorium-234	-0.380	U	1.05	1.05		0.871	pCi/g	06/17/21 11:56	07/08/21 17:27	1
Uranium-235	0.0221	U	0.271	0.271		0.437	pCi/g	06/17/21 11:56	07/08/21 17:27	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-012**

**Lab Sample ID: 160-42415-14**

Date Collected: 06/10/21 13:28

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	-0.380	U	1.05	1.05		0.871	pCi/g	06/17/21 11:56	07/08/21 17:27	1

**Client Sample ID: HPPG-SFU-TU100A-013**

**Lab Sample ID: 160-42415-15**

Date Collected: 06/10/21 13:25

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.355		0.182	0.187		0.141	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Actinium-227	0.305	U	0.456	0.457		0.315	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Americium-241	-0.0642	U	0.182	0.182		0.148	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Bismuth-212	-0.318	U	0.828	0.829		0.650	pCi/g	06/17/21 13:33	07/09/21 15:32	1
<b>Bismuth-214</b>	<b>0.565</b>		0.184	0.195		0.0707	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Cesium-137	0.0239	U	0.0561	0.0562	0.0700	0.0433	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Lead-210	-0.884	U	1.93	1.93		1.62	pCi/g	06/17/21 13:33	07/09/21 15:32	1
<b>Lead-212</b>	<b>0.388</b>		0.108	0.118		0.0641	pCi/g	06/17/21 13:33	07/09/21 15:32	1
<b>Lead-214</b>	<b>0.506</b>		0.143	0.154		0.0630	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Potassium-40	7.99		1.43	1.70		0.337	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Protactinium-231	0.828	U	2.72	2.72		2.21	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Protactinium-234	0.204	U	0.339	0.340		0.266	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Radium-226	0.565		0.184	0.195	0.200	0.0707	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Radium-228	0.355		0.182	0.187		0.141	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Thallium-208	0.149		0.0686	0.0707		0.0309	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Thorium 228	0.388		0.108	0.118		0.0641	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Thorium-232	0.355		0.182	0.187		0.141	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Thorium-234	0.521		0.623	0.627		0.481	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Uranium-235	0.0267	U	0.551	0.551		0.453	pCi/g	06/17/21 13:33	07/09/21 15:32	1
Uranium-238	0.521		0.623	0.627		0.481	pCi/g	06/17/21 13:33	07/09/21 15:32	1

**Client Sample ID: HPPG-SFU-TU100A-014**

**Lab Sample ID: 160-42415-16**

Date Collected: 06/10/21 13:18

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.422		0.159	0.164		0.0970	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Actinium-227	0.219	U	0.381	0.382		0.296	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Americium-241	0.00638	U	0.116	0.116		0.0804	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Bismuth-212	-0.0205	U	0.799	0.799		0.486	pCi/g	06/17/21 11:56	07/08/21 18:38	1
<b>Bismuth-214</b>	<b>0.451</b>		0.130	0.139		0.0381	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Cesium-137	-0.00361	U	0.112	0.112	0.0700	0.0922	pCi/g	06/17/21 11:56	07/08/21 18:38	1
<b>Lead-210</b>	<b>0.852</b>		1.08	1.08		0.724	pCi/g	06/17/21 11:56	07/08/21 18:38	1
<b>Lead-212</b>	<b>0.466</b>		0.100	0.117		0.0400	pCi/g	06/17/21 11:56	07/08/21 18:38	1
<b>Lead-214</b>	<b>0.448</b>		0.141	0.148		0.0623	pCi/g	06/17/21 11:56	07/08/21 18:38	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-014**

**Lab Sample ID: 160-42415-16**

Date Collected: 06/10/21 13:18  
Date Received: 06/14/21 08:45

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Potassium-40	8.22		1.61	1.82		0.295	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Protactinium-231	0.0768	U	2.63	2.63		2.16	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Protactinium-234	0.0870	U	0.226	0.227		0.164	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Radium-226	0.451		0.130	0.139	0.200	0.0381	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Radium-228	0.422		0.159	0.164		0.0970	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Thallium-208	0.139		0.104	0.105		0.0419	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Thorium 228	0.466		0.100	0.117		0.0400	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Thorium-232	0.422		0.159	0.164		0.0970	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Thorium-234	1.03		0.547	0.559		0.452	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Uranium-235	0.169	U	0.302	0.303		0.271	pCi/g	06/17/21 11:56	07/08/21 18:38	1
Uranium-238	1.03		0.547	0.559		0.452	pCi/g	06/17/21 11:56	07/08/21 18:38	1

**Client Sample ID: HPPG-SFU-TU100A-015**

**Lab Sample ID: 160-42415-17**

Date Collected: 06/10/21 13:19  
Date Received: 06/14/21 08:45

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.112		0.105	0.106		0.0443	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Actinium-227	0.0839	U	0.183	0.183		0.196	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Americium-241	-0.0133	U	0.0818	0.0818		0.0504	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Bismuth-212	-0.342	U	0.591	0.592		0.460	pCi/g	06/17/21 11:56	07/08/21 18:44	1
<b>Bismuth-214</b>	<b>0.308</b>		0.0907	0.0962		0.0369	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Cesium-137	-0.0299	U	0.0481	0.0482	0.0700	0.0372	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Lead-210	-0.0319	U	0.897	0.897		0.737	pCi/g	06/17/21 11:56	07/08/21 18:44	1
<b>Lead-212</b>	<b>0.152</b>		0.0482	0.0520		0.0261	pCi/g	06/17/21 11:56	07/08/21 18:44	1
<b>Lead-214</b>	<b>0.240</b>		0.0700	0.0743		0.0295	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Potassium-40	4.41		0.817	0.933		0.219	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Protactinium-231	0.395	U	1.21	1.21		1.32	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Protactinium-234	-0.0263	U	0.0696	0.0696		0.160	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Radium-226	0.308		0.0907	0.0962	0.200	0.0369	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Radium-228	0.112		0.105	0.106		0.0443	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Thallium-208	0.0603		0.0250	0.0258		0.00867	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Thorium 228	0.152		0.0482	0.0520		0.0261	pCi/g	06/17/21 11:56	07/08/21 18:44	1
<b>Thorium-232</b>	<b>0.112</b>		0.105	0.106		0.0443	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Thorium-234	0.206	U	0.726	0.726		0.592	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Uranium-235	0.141	U	0.247	0.248		0.261	pCi/g	06/17/21 11:56	07/08/21 18:44	1
Uranium-238	0.206	U	0.726	0.726		0.592	pCi/g	06/17/21 11:56	07/08/21 18:44	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

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 Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-42415-1  
 SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-016**
**Lab Sample ID: 160-42415-18**

 Date Collected: 06/10/21 13:24  
 Date Received: 06/14/21 08:45

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.582		0.186	0.195		0.120	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Actinium-227	0.0478	U	0.188	0.188		0.407	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Americium-241	-0.0821	U	0.216	0.216		0.175	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Bismuth-212	0.437	U	0.894	0.895		0.701	pCi/g	06/17/21 11:56	07/08/21 18:39	1
<b>Bismuth-214</b>	<b>0.528</b>		0.137	0.147		0.0599	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Cesium-137	-0.0468	U	0.0920	0.0921	0.0700	0.0727	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Lead-210	-0.769	U	2.24	2.25		1.87	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Lead-212	0.483		0.0984	0.111		0.0467	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Lead-214	0.603		0.163	0.174		0.0673	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Potassium-40	9.33		1.43	1.72		0.288	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Protactinium-231	0.680	U	2.02	2.02		2.21	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Protactinium-234	-0.111	U	0.331	0.331		0.270	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Radium-226	0.528		0.137	0.147	0.200	0.0599	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Radium-228	0.582		0.186	0.195		0.120	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Thallium-208	0.215		0.0598	0.0637		0.0148	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Thorium 228	0.483		0.0984	0.111		0.0467	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Thorium-232	0.582		0.186	0.195		0.120	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Thorium-234	0.727		0.659	0.664		0.457	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Uranium-235	0.196	U	0.430	0.430		0.462	pCi/g	06/17/21 11:56	07/08/21 18:39	1
Uranium-238	0.727		0.659	0.664		0.457	pCi/g	06/17/21 11:56	07/08/21 18:39	1

**Client Sample ID: HPPG-SFU-TU100A-017**
**Lab Sample ID: 160-42415-19**

 Date Collected: 06/10/21 13:27  
 Date Received: 06/14/21 08:45

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.557		0.133	0.145		0.0221	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Actinium-227	-0.0467	U	0.460	0.460		0.272	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Americium-241	0.0577	U	0.129	0.129		0.104	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Bismuth-212	0.000	U	0.451	0.451		0.511	pCi/g	06/17/21 11:56	07/08/21 18:41	1
<b>Bismuth-214</b>	<b>0.406</b>		0.0931	0.102		0.0305	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Cesium-137	0.0276	U	0.0512	0.0513	0.0700	0.0399	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Lead-210	0.576	U	1.05	1.05		0.834	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Lead-212	0.452		0.0809	0.0998		0.0386	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Lead-214	0.453		0.0868	0.0987		0.0441	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Potassium-40	7.69		1.07	1.33		0.0874	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Protactinium-231	0.111	U	1.17	1.17		1.80	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Protactinium-234	-0.0390	U	0.0961	0.0962		0.224	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Radium-226	0.406		0.0931	0.102	0.200	0.0305	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Radium-228	0.557		0.133	0.145		0.0221	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Thallium-208	0.133		0.0606	0.0621		0.0279	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Thorium 228	0.452		0.0809	0.0998		0.0386	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Thorium-232	0.557		0.133	0.145		0.0221	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Thorium-234	-0.316	U	1.08	1.08		0.880	pCi/g	06/17/21 11:56	07/08/21 18:41	1
Uranium-235	0.146	U	0.443	0.443		0.361	pCi/g	06/17/21 11:56	07/08/21 18:41	1

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# Client Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-017**

**Lab Sample ID: 160-42415-19**

Date Collected: 06/10/21 13:27

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	-0.316	U	1.08	1.08		0.880	pCi/g	06/17/21 11:56	07/08/21 18:41	1

**Client Sample ID: HPPG-SFU-TU100A-018**

**Lab Sample ID: 160-42415-20**

Date Collected: 06/10/21 13:31

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.306		0.209	0.212		0.0879	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Actinium-227	0.324		0.483	0.484		0.321	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Americium-241	-0.0450	U	0.188	0.189		0.154	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Bismuth-212	0.324	U	0.855	0.856		0.672	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Bismuth-214	0.439		0.167	0.175		0.0720	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Cesium-137	-0.0354	U	0.0447	0.0449	0.0700	0.0619	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Lead-210	-0.814	U	2.15	2.15		1.79	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Lead-212	0.238		0.0998	0.104		0.0659	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Lead-214	0.481		0.134	0.145		0.0802	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Potassium-40	8.15		1.59	1.85		0.460	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Protactinium-231	0.377	U	1.56	1.56		2.44	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Protactinium-234	0.0932	U	0.251	0.251		0.255	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Radium-226	0.439		0.167	0.175	0.200	0.0720	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Radium-228	0.306		0.209	0.212		0.0879	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Thallium-208	0.175		0.0763	0.0790		0.0315	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Thorium 228	0.238		0.0998	0.104		0.0659	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Thorium-232	0.306		0.209	0.212		0.0879	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Thorium-234	-0.517	U	0.864	0.866		0.946	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Uranium-235	-0.0427	U	0.0645	0.0647		0.488	pCi/g	06/17/21 11:56	07/08/21 18:52	1
Uranium-238	-0.517	U	0.864	0.866		0.946	pCi/g	06/17/21 11:56	07/08/21 18:52	1

**Client Sample ID: HPPG-SFU-TU100A-019**

**Lab Sample ID: 160-42415-21**

Date Collected: 06/10/21 13:35

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.236	U	0.143	0.145		0.261	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Actinium-227	0.0510	U	0.311	0.311		0.425	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Americium-241	-0.0777	U	0.102	0.102		0.105	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Bismuth-212	-0.0201	U	0.784	0.784		0.555	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Bismuth-214	0.625		0.151	0.164		0.0374	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Cesium-137	-0.00332	U	0.0857	0.0857	0.0700	0.0706	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Lead-210	0.616	U	1.17	1.17		0.802	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Lead-212	0.428		0.110	0.123		0.0591	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Lead-214	0.499		0.142	0.151		0.0663	pCi/g	06/17/21 11:56	07/08/21 20:07	1

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# Client Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-019**

**Lab Sample ID: 160-42415-21**

Date Collected: 06/10/21 13:35

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Potassium-40	8.50		1.62	1.84		0.289	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Protactinium-231	-0.0240	U	2.93	2.93		2.41	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Protactinium-234	0.0518	U	0.140	0.140		0.175	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Radium-226	0.625		0.151	0.164	0.200	0.0374	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Radium-228	0.236	U	0.143	0.145		0.261	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Thallium-208	0.174		0.0633	0.0658		0.0219	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Thorium 228	0.428		0.110	0.123		0.0591	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Thorium-232	0.236	U	0.143	0.145		0.261	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Thorium-234	0.474	U	0.403	0.406		0.801	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Uranium-235	0.177	U	0.313	0.314		0.234	pCi/g	06/17/21 11:56	07/08/21 20:07	1
Uranium-238	0.474	U	0.403	0.406		0.801	pCi/g	06/17/21 11:56	07/08/21 20:07	1

**Client Sample ID: HPPG-SFU-TU100A-020**

**Lab Sample ID: 160-42415-22**

Date Collected: 06/10/21 13:39

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.417		0.159	0.164		0.0505	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Actinium-227	-0.240	U	0.501	0.502		0.289	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Americium-241	-0.0435	U	0.125	0.125		0.0766	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Bismuth-212	-0.348	U	0.673	0.674		0.527	pCi/g	06/17/21 11:56	07/08/21 20:08	1
<b>Bismuth-214</b>	<b>0.347</b>		0.0884	0.0954		0.0310	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Cesium-137	0.0185	U	0.0465	0.0465	0.0700	0.0365	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Lead-210	-0.605	U	1.34	1.34		1.08	pCi/g	06/17/21 11:56	07/08/21 20:08	1
<b>Lead-212</b>	<b>0.354</b>		0.0711	0.0846		0.0326	pCi/g	06/17/21 11:56	07/08/21 20:08	1
<b>Lead-214</b>	<b>0.317</b>		0.0919	0.0976		0.0397	pCi/g	06/17/21 11:56	07/08/21 20:08	1
<b>Potassium-40</b>	<b>5.72</b>		0.986	1.15		0.250	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Protactinium-231	-0.726	U	2.27	2.27		1.84	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Protactinium-234	0.0144	U	0.196	0.196		0.172	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Radium-226	0.347		0.0884	0.0954	0.200	0.0310	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Radium-228	0.417		0.159	0.164		0.0505	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Thallium-208	0.0809		0.0375	0.0385		0.0165	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Thorium 228	0.354		0.0711	0.0846		0.0326	pCi/g	06/17/21 11:56	07/08/21 20:08	1
<b>Thorium-232</b>	<b>0.417</b>		0.159	0.164		0.0505	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Thorium-234	0.183	U	0.435	0.436		0.806	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Uranium-235	0.0793	U	0.165	0.165		0.294	pCi/g	06/17/21 11:56	07/08/21 20:08	1
Uranium-238	0.183	U	0.435	0.436		0.806	pCi/g	06/17/21 11:56	07/08/21 20:08	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-021**

**Lab Sample ID: 160-42415-23**

Date Collected: 06/10/21 13:43

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.103	U	0.145	0.145	0.331	0.110	pCi/g	06/30/21 09:37	07/12/21 17:17	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	80.8		40 - 110					06/30/21 09:37	07/12/21 17:17	1
Y Carrier	96.4		40 - 110					06/30/21 09:37	07/12/21 17:17	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.391		0.190	0.194		0.111	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Actinium-227	0.276	U	0.411	0.412		0.293	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Americium-241	-0.0673	U	0.180	0.180		0.146	pCi/g	06/17/21 11:56	07/08/21 20:09	1
<b>Bismuth-212</b>	<b>0.836</b>		0.468	0.476		0.166	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Bismuth-214	0.175	U	0.0901	0.0919		0.181	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Cesium-137	0.0266	U	0.0692	0.0693	0.0700	0.0549	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Lead-210	-1.07	U	1.93	1.94		1.63	pCi/g	06/17/21 11:56	07/08/21 20:09	1
<b>Lead-212</b>	<b>0.380</b>		0.0877	0.0962		0.0450	pCi/g	06/17/21 11:56	07/08/21 20:09	1
<b>Lead-214</b>	<b>0.455</b>		0.116	0.125		0.0545	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Potassium-40	8.34		1.42	1.65		0.369	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Protactinium-231	0.627	U	1.79	1.79		1.97	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Protactinium-234	0.141	U	0.195	0.195		0.214	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Radium-226	0.175	U	0.0901	0.0919	0.200	0.181	pCi/g	06/17/21 11:56	07/08/21 20:09	1
<b>Radium-228</b>	<b>0.391</b>		0.190	0.194		0.111	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Thallium-208	0.196		0.0561	0.0595		0.0142	pCi/g	06/17/21 11:56	07/08/21 20:09	1
<b>Thorium 228</b>	<b>0.380</b>		0.0877	0.0962		0.0450	pCi/g	06/17/21 11:56	07/08/21 20:09	1
<b>Thorium-232</b>	<b>0.391</b>		0.190	0.194		0.111	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Thorium-234	-0.913	U	0.605	0.614		0.838	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Uranium-235	0.0634	U	0.0892	0.0894		0.447	pCi/g	06/17/21 11:56	07/08/21 20:09	1
Uranium-238	-0.913	U	0.605	0.614		0.838	pCi/g	06/17/21 11:56	07/08/21 20:09	1

**Client Sample ID: HPPG-SFU-TU100A-022**

**Lab Sample ID: 160-42415-24**

Date Collected: 06/10/21 13:44

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.500		0.100	0.113		0.0216	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Actinium-227	-0.0607	U	0.464	0.464		0.274	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Americium-241	-0.0253	U	0.128	0.128		0.0791	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Bismuth-212	0.293	U	0.474	0.475		0.359	pCi/g	06/17/21 11:14	07/08/21 21:09	1
<b>Bismuth-214</b>	<b>0.392</b>		0.101	0.109		0.0393	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Cesium-137	0.0133	U	0.0545	0.0546	0.0700	0.0439	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Lead-210	0.375	U	1.03	1.03		0.826	pCi/g	06/17/21 11:14	07/08/21 21:09	1
<b>Lead-212</b>	<b>0.438</b>		0.0800	0.0981		0.0394	pCi/g	06/17/21 11:14	07/08/21 21:09	1
<b>Lead-214</b>	<b>0.363</b>		0.0794	0.0879		0.0611	pCi/g	06/17/21 11:14	07/08/21 21:09	1

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# Client Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-022**

**Lab Sample ID: 160-42415-24**

Date Collected: 06/10/21 13:44  
Date Received: 06/14/21 08:45

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Potassium-40	5.12		0.865	1.01		0.0851	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Protactinium-231	0.000	U	0.422	0.422		1.71	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Protactinium-234	0.0789	U	0.225	0.226		0.183	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Radium-226	0.392		0.101	0.109	0.200	0.0393	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Radium-228	0.500		0.100	0.113		0.0216	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Thallium-208	0.154		0.0486	0.0511		0.0189	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Thorium 228	0.438		0.0800	0.0981		0.0394	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Thorium-232	0.500		0.100	0.113		0.0216	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Thorium-234	0.411		0.494	0.496		0.302	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Uranium-235	0.000	U	0.0800	0.0800		0.381	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Uranium-238	0.411		0.494	0.496		0.302	pCi/g	06/17/21 11:14	07/08/21 21:09	1

**Client Sample ID: HPPG-SFU-TU100A-023**

**Lab Sample ID: 160-42415-25**

Date Collected: 06/10/21 13:45  
Date Received: 06/14/21 08:45

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.734		0.194	0.212		0.0788	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Actinium-227	0.131	U	0.282	0.282		0.426	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Americium-241	-0.0474	U	0.156	0.157		0.101	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Bismuth-212	0.563	U	1.10	1.10		0.862	pCi/g	06/17/21 11:14	07/08/21 21:09	1
<b>Bismuth-214</b>	<b>0.450</b>		0.160	0.168		0.0644	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Cesium-137	0.000148	U	0.0599	0.0599	0.0700	0.0493	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Lead-210	-1.69	U	1.60	1.61		1.89	pCi/g	06/17/21 11:14	07/08/21 21:09	1
<b>Lead-212</b>	<b>0.380</b>		0.103	0.112		0.0590	pCi/g	06/17/21 11:14	07/08/21 21:09	1
<b>Lead-214</b>	<b>0.438</b>		0.105	0.116		0.0604	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Potassium-40	9.25		1.52	1.85		0.332	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Protactinium-231	-1.03	U	3.38	3.39		2.75	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Protactinium-234	-0.0493	U	0.121	0.121		0.316	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Radium-226	0.450		0.160	0.168	0.200	0.0644	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Radium-228	0.734		0.194	0.212		0.0788	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Thallium-208	0.229		0.0620	0.0674		0.0173	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Thorium 228	0.380		0.103	0.112		0.0590	pCi/g	06/17/21 11:14	07/08/21 21:09	1
<b>Thorium-232</b>	<b>0.734</b>		0.194	0.212		0.0788	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Thorium-234	0.0458	U	0.524	0.524		0.424	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Uranium-235	0.0124	U	0.0234	0.0235		0.601	pCi/g	06/17/21 11:14	07/08/21 21:09	1
Uranium-238	0.0458	U	0.524	0.524		0.424	pCi/g	06/17/21 11:14	07/08/21 21:09	1

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# Client Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-024**

**Lab Sample ID: 160-42415-26**

Matrix: Solid

Date Collected: 06/10/21 13:57  
Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	<b>0.281</b>		0.216	0.217		0.0845	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Actinium-227	0.0821	U	0.333	0.333		0.331	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Americium-241	0.0197	U	0.0850	0.0850		0.0583	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Bismuth-212	0.342	U	0.631	0.632		0.471	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Bismuth-214	0.0904	U	0.170	0.171		0.234	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Cesium-137	-0.0164	U	0.0534	0.0534	0.0700	0.0289	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Lead-210	-0.753	U	0.745	0.751		0.973	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Lead-212	<b>0.259</b>		0.0733	0.0806		0.0336	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Lead-214	<b>0.358</b>		0.0950	0.102		0.0527	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Potassium-40	<b>6.63</b>		1.36	1.52		0.257	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Protactinium-231	-0.745	U	2.26	2.26		1.82	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Protactinium-234	0.0718	U	0.187	0.187		0.129	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Radium-226	0.0904	U	0.170	0.171	0.200	0.234	pCi/g	06/17/21 11:14	07/08/21 21:44	1
<b>Radium-228</b>	<b>0.281</b>		0.216	0.217		0.0845	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Thallium-208	<b>0.0776</b>		0.0556	0.0562		0.0264	pCi/g	06/17/21 11:14	07/08/21 21:44	1
<b>Thorium 228</b>	<b>0.259</b>		0.0733	0.0806		0.0336	pCi/g	06/17/21 11:14	07/08/21 21:44	1
<b>Thorium-232</b>	<b>0.281</b>		0.216	0.217		0.0845	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Thorium-234	0.233	U	0.366	0.367		0.310	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Uranium-235	0.0891	U	0.277	0.277		0.223	pCi/g	06/17/21 11:14	07/08/21 21:44	1
Uranium-238	0.233	U	0.366	0.367		0.310	pCi/g	06/17/21 11:14	07/08/21 21:44	1

**Client Sample ID: HPPG-SFU-TU100A-025**

**Lab Sample ID: 160-42415-27**

Matrix: Solid

Date Collected: 06/10/21 14:00  
Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	<b>0.409</b>		0.129	0.136		0.0811	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Actinium-227	0.0591	U	0.201	0.201		0.285	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Americium-241	0.0541	U	0.118	0.118		0.0950	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Bismuth-212	0.162	U	0.391	0.391		0.302	pCi/g	06/17/21 11:14	07/08/21 21:46	1
<b>Bismuth-214</b>	<b>0.401</b>		0.0897	0.0989		0.0288	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Cesium-137	-0.0251	U	0.0599	0.0600	0.0700	0.0477	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Lead-210	0.197	U	1.02	1.02		0.829	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Lead-212	<b>0.380</b>		0.0718	0.0870		0.0337	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Lead-214	<b>0.327</b>		0.0799	0.0869		0.0446	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Potassium-40	<b>7.29</b>		1.06	1.29		0.231	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Protactinium-231	0.279	U	1.04	1.04		1.63	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Protactinium-234	0.0166	U	0.0298	0.0298		0.175	pCi/g	06/17/21 11:14	07/08/21 21:46	1
<b>Radium-226</b>	<b>0.401</b>		0.0897	0.0989	0.200	0.0288	pCi/g	06/17/21 11:14	07/08/21 21:46	1
<b>Radium-228</b>	<b>0.409</b>		0.129	0.136		0.0811	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Thallium-208	<b>0.172</b>		0.0498	0.0529		0.0174	pCi/g	06/17/21 11:14	07/08/21 21:46	1
<b>Thorium 228</b>	<b>0.380</b>		0.0718	0.0870		0.0337	pCi/g	06/17/21 11:14	07/08/21 21:46	1
<b>Thorium-232</b>	<b>0.409</b>		0.129	0.136		0.0811	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Thorium-234	0.0478	U	0.432	0.432		0.744	pCi/g	06/17/21 11:14	07/08/21 21:46	1
Uranium-235	0.0821	U	0.330	0.330		0.269	pCi/g	06/17/21 11:14	07/08/21 21:46	1

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# Client Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

**Client Sample ID: HPPG-SFU-TU100A-025**

**Lab Sample ID: 160-42415-27**

Date Collected: 06/10/21 14:00

Matrix: Solid

Date Received: 06/14/21 08:45

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	0.0478	U	0.432	0.432		0.744	pCi/g	06/17/21 11:14	07/08/21 21:46	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

## Method: 905 - Strontium-90 (GFPC)

Lab Sample ID: MB 160-516657/23-A

Matrix: Solid

Analysis Batch: 518279

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 516657

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Strontium-90	0.06332	U	0.155	0.155	0.331	0.122	pCi/g	06/30/21 09:37	07/12/21 17:13	1

Carrier	MB MB		%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	%Yield	Qualifier						
Sr Carrier	82.2		40 - 110			06/30/21 09:37	07/12/21 17:13	1
Y Carrier	94.0		40 - 110			06/30/21 09:37	07/12/21 17:13	1

Lab Sample ID: LCS 160-516657/1-A

Matrix: Solid

Analysis Batch: 518289

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 516657

Analyte	MB MB		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.	Limits
	Result	Qualifier									
Strontium-90	8.20		8.671			0.882	0.331	0.119	pCi/g	106	75 - 125

Carrier	LCS LCS		%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	%Yield	Qualifier						
Sr Carrier	86.3		40 - 110					
Y Carrier	97.3		40 - 110					

Lab Sample ID: MB 160-519394/23-A

Matrix: Solid

Analysis Batch: 520677

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 519394

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Strontium-90	0.04134	U	0.0605	0.0606	0.331	0.0468	pCi/g	07/20/21 12:00	07/29/21 19:09	1

Carrier	MB MB		%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	%Yield	Qualifier						
Sr Carrier	84.0		40 - 110			07/20/21 12:00	07/29/21 19:09	1
Y Carrier	92.6		40 - 110			07/20/21 12:00	07/29/21 19:09	1

Lab Sample ID: LCS 160-519394/1-A

Matrix: Solid

Analysis Batch: 520677

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 519394

Analyte	MB MB		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.	Limits
	Result	Qualifier									
Strontium-90	2.44		2.352			0.252	0.331	0.0451	pCi/g	96	75 - 125

Carrier	LCS LCS		%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	%Yield	Qualifier						
Sr Carrier	85.3		40 - 110					
Y Carrier	92.3		40 - 110					

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# QC Sample Results

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 Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-42415-1  
 SDG: GJ46599755

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

**Lab Sample ID:** MB 160-514699/1-A

**Matrix:** Solid

**Analysis Batch:** 517673

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514699

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)	Uncert.	(2σ+/-)					
Actinium 228	0.0000	U		0.0251		0.0251		0.0924	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Actinium-227	0.04865	U		0.112		0.113		0.255	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Americium-241	-0.01309	U		0.103		0.103		0.0840	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Bismuth-212	0.0000	U		0.138		0.138		0.240	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Bismuth-214	-0.1315	U		0.113		0.114		0.184	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Cesium-137	0.001115	U		0.0376		0.0376	0.0700	0.0308	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Lead-210	0.3846	U		0.820		0.821		0.638	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Lead-212	0.03203	U		0.0792		0.0793		0.0631	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Lead-214	-0.001076	U		0.00920		0.00920		0.0740	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Potassium-40	-0.04049	U		0.705		0.705		0.429	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Protactinium-231	0.1282	U		0.788		0.788		1.23	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Protactinium-234	0.1038	U		0.190		0.191		0.117	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Radium-226	-0.1315	U		0.113		0.114	0.200	0.184	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Radium-228	0.0000	U		0.0251		0.0251		0.0924	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Thallium-208	0.02056	U		0.0617		0.0617		0.0297	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Thorium 228	0.03203	U		0.0792		0.0793		0.0631	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Thorium-232	0.0000	U		0.0251		0.0251		0.0924	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Thorium-234	0.0000	U		0.101		0.101		0.488	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Uranium-235	0.0000	U		0.106		0.106		0.225	pCi/g	06/17/21 11:14	07/08/21 21:07	1
Uranium-238	0.0000	U		0.101		0.101		0.488	pCi/g	06/17/21 11:14	07/08/21 21:07	1

**Lab Sample ID:** LCS 160-514699/2-A

**Matrix:** Solid

**Analysis Batch:** 517672

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 514699

Analyte	Spike Added	LCS		Uncert.	Total		DLC	Unit	%Rec	Limits	%Rec.
		Result	Qual		(2σ+/-)	LOQ					
Americium-241	96.3	98.23		11.6			0.635	pCi/g	102	87 - 116	
Cesium-137	26.4	29.09		3.05	0.0700		0.0758	pCi/g	110	87 - 120	
Cobalt-60	8.79	9.551		1.01			0.0319	pCi/g	109	87 - 115	

**Lab Sample ID:** MB 160-514701/1-A

**Matrix:** Solid

**Analysis Batch:** 517578

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514701

Analyte	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac	
			Result	Qualifier	(2σ+/-)	(2σ+/-)						
Actinium 228	-0.04686	U		0.232		0.232	0.122	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Actinium-227	0.02790	U		0.0548		0.0549	0.402	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Americium-241	0.05339	U		0.0892		0.0894	0.0585	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Bismuth-212	-0.02583	U		1.39		1.39	0.610	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Bismuth-214	0.08057	U		0.120		0.120	0.147	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Cesium-137	-0.06468	U		0.111		0.112	0.0700	0.0690	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Lead-210	-0.3945	U		1.22		1.22	0.922	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Lead-212	0.0008482	U		0.0817		0.0817	0.0669	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Lead-214	-0.01631	U		0.0479		0.0480	0.0925	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Potassium-40	-0.2675	U		1.26		1.26	0.371	pCi/g	06/17/21 11:56	07/08/21 13:55	1	
Protactinium-231	0.2164	U		1.16		1.16	1.81	pCi/g	06/17/21 11:56	07/08/21 13:55	1	

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# QC Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** MB 160-514701/1-A

**Matrix:** Solid

**Analysis Batch:** 517578

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514701

Analyte	Result	MB	MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Protactinium-234	-0.007882	U		0.0216	0.0216	0.136	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Radium-226	0.08057	U		0.120	0.120	0.200	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Radium-228	-0.04686	U		0.232	0.232	0.122	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Thallium-208	0.03120	U		0.0682	0.0682	0.0381	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Thorium 228	0.0008482	U		0.0817	0.0817	0.0669	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Thorium-232	-0.04686	U		0.232	0.232	0.122	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Thorium-234	0.2299	U		0.500	0.500	0.389	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Uranium-235	-0.01634	U		0.311	0.311	0.236	pCi/g	06/17/21 11:56	07/08/21 13:55	1
Uranium-238	0.2299	U		0.500	0.500	0.389	pCi/g	06/17/21 11:56	07/08/21 13:55	1

**Lab Sample ID:** LCS 160-514701/2-A

**Matrix:** Solid

**Analysis Batch:** 518258

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 514701

Analyte	Spike Added	LCS	LCS Result	Total			%Rec.	Limits	
				Qual	Uncert. (2σ+/-)	LOQ	DLC	Unit	
Americium-241	96.3	94.13			9.86		0.454	pCi/g	98 87 - 116
Cesium-137	26.4	25.67			2.73	0.0700	0.0825	pCi/g	97 87 - 120
Cobalt-60	8.78	8.419			0.888		0.0317	pCi/g	96 87 - 115

**Lab Sample ID:** MB 160-514709/1-A

**Matrix:** Solid

**Analysis Batch:** 517773

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514709

Analyte	Result	MB	MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Actinium 228	0.0000	U		0.0251	0.0251	0.0292	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Actinium-227	0.04141	U		0.367	0.367	0.216	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Americium-241	-0.005235	U		0.0874	0.0874	0.0716	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Bismuth-212	0.3190	U		0.651	0.652	0.503	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Bismuth-214	-0.02067	U		0.115	0.115	0.0958	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Cesium-137	0.0000	U		0.0134	0.0134	0.0340	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Lead-210	0.1491	U		0.793	0.793	0.638	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Lead-212	-0.04136	U		0.0922	0.0924	0.0736	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Lead-214	0.01237	U		0.0888	0.0888	0.0663	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Potassium-40	-0.04049	U		0.392	0.392	0.323	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Protactinium-231	0.4031	U		1.19	1.19	1.28	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Protactinium-234	-0.06831	U		0.197	0.197	0.159	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Radium-226	-0.02067	U		0.115	0.115	0.0958	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Radium-228	0.0000	U		0.0251	0.0251	0.0292	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Thallium-208	0.01374	U		0.0207	0.0208	0.0368	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Thorium 228	-0.04136	U		0.0922	0.0924	0.0736	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Thorium-232	0.0000	U		0.0251	0.0251	0.0292	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Thorium-234	-0.02985	U		0.626	0.626	0.514	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Uranium-235	0.0000	U		0.135	0.135	0.295	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Uranium-238	-0.02985	U		0.626	0.626	0.514	pCi/g	06/17/21 13:33	07/09/21 14:16	1

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# QC Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID: LCS 160-514709/2-A**

Matrix: Solid

Analysis Batch: 517775

**Client Sample ID: Lab Control Sample**

Prep Type: Total/NA

Prep Batch: 514709

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	LOQ	Total		%Rec.	Limits
		Result	Qual			DLC	Unit		
Americium-241	96.3	95.38		11.2		0.559	pCi/g	99	87 - 116
Cesium-137	26.4	29.07		3.06	0.0700	0.143	pCi/g	110	87 - 120
Cobalt-60	8.78	9.377		0.994		0.0712	pCi/g	107	87 - 115

**Lab Sample ID: 160-42415-15 DU**

Matrix: Solid

Analysis Batch: 517994

**Client Sample ID: HPPG-SFU-TU100A-013**

Prep Type: Total/NA

Prep Batch: 514709

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)					
Actinium 228	0.355		0.2355		0.111		0.149	pCi/g	0.40	1
Actinium-227	0.305	U	0.3873		0.370		0.260	pCi/g	0.1	1
Americium-241	-0.0642	U	0.06245	U	0.146		0.118	pCi/g	0.39	1
Bismuth-212	-0.318	U	0.4493	U	0.829		0.643	pCi/g	0.46	1
Bismuth-214	0.565		0.3064		0.127		0.0579	pCi/g	0.80	1
Cesium-137	0.0239	U	0.03582	U	0.0680	0.0700	0.0528	pCi/g	0.1	1
Lead-210	-0.884	U	0.8822	U	1.38		0.951	pCi/g	0.53	1
Lead-212	0.388		0.3522		0.0929		0.0431	pCi/g	0.17	1
Lead-214	0.506		0.4393		0.124		0.0440	pCi/g	0.24	1
Potassium-40	7.99		8.056		1.54		0.277	pCi/g	0.02	1
Protactinium-231	0.828	U	0.0000	U	0.454		2.18	pCi/g	0.26	1
Protactinium-234	0.204	U	0.08445	U	0.257		0.206	pCi/g	0.20	1
Radium-226	0.565		0.3064		0.127	0.200	0.0579	pCi/g	0.80	1
Radium-228	0.355		0.2355		0.111		0.149	pCi/g	0.40	1
Thallium-208	0.149		0.08014		0.0807		0.0511	pCi/g	0.45	1
Thorium 228	0.388		0.3522		0.0929		0.0431	pCi/g	0.17	1
Thorium-232	0.355		0.2355		0.111		0.149	pCi/g	0.40	1
Thorium-234	0.521		-0.2953	U	0.963		0.800	pCi/g	0.51	1
Uranium-235	0.0267	U	0.0000	U	0.245		0.381	pCi/g	0.03	1
Uranium-238	0.521		-0.2953	U	0.963		0.800	pCi/g	0.51	1

**Lab Sample ID: MB 160-514714/1-A**

Matrix: Solid

Analysis Batch: 517996

**Client Sample ID: Method Blank**

Prep Type: Total/NA

Prep Batch: 514714

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	(2σ+/-)	(2σ+/-)				Prepared	Analyzed	Dil Fac
Actinium 228	-0.007820	U	0.237	0.237		0.0546	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Actinium-227	0.1297	U	0.324	0.324		0.306	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Americium-241	-0.04867	U	0.104	0.104		0.0777	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Bismuth-212	-0.3937	U	1.39	1.39		0.747	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Bismuth-214	0.008074	U	0.181	0.181		0.147	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Cesium-137	-0.02373	U	0.111	0.112	0.0700	0.0649	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Lead-210	0.2019	U	1.16	1.16		0.837	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Lead-212	0.01368	U	0.132	0.132		0.108	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Lead-214	0.01155	U	0.0668	0.0668		0.105	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Potassium-40	-0.2675	U	0.720	0.720		0.371	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Protactinium-231	0.0000	U	0.921	0.921		1.87	pCi/g	06/17/21 14:30	07/10/21 08:36	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

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 Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-42415-1  
 SDG: GJ46599755

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** MB 160-514714/1-A

**Client Sample ID:** Method Blank

**Matrix:** Solid

**Analysis Batch:** 517996

**Prep Type:** Total/NA

**Prep Batch:** 514714

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)	Uncert.	(2σ+/-)					
Protactinium-234	0.05503	U		0.142	0.142			0.111	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Radium-226	0.008074	U		0.181	0.181	0.200		0.147	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Radium-228	-0.007820	U		0.237	0.237			0.0546	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thallium-208	-0.03729	U		0.0527	0.0528			0.0587	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thorium 228	0.01368	U		0.132	0.132			0.108	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thorium-232	-0.007820	U		0.237	0.237			0.0546	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thorium-234	0.2755	U		0.483	0.484			0.363	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Uranium-235	-0.001853	U		0.00269	0.00270			0.225	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Uranium-238	0.2755	U		0.483	0.484			0.363	pCi/g	06/17/21 14:30	07/10/21 08:36	1

**Lab Sample ID:** LCS 160-514714/2-A

**Client Sample ID:** Lab Control Sample

**Matrix:** Solid

**Analysis Batch:** 517992

**Prep Type:** Total/NA

**Prep Batch:** 514714

Analyte	Spike Added	LCS Result	LCS Qual	Total			%Rec.	Limits			
				Uncert.	(2σ+/-)	LOQ	DLC	Unit			
Americium-241	96.3	96.32		10.1			0.553	pCi/g	100	87 - 116	
Cesium-137	26.4	26.71		2.86	0.0700		0.102	pCi/g	101	87 - 120	
Cobalt-60	8.78	8.391		0.895			0.0306	pCi/g	96	87 - 115	

**Lab Sample ID:** 160-42415-2 DU

**Client Sample ID:** HPPG-F-074

**Matrix:** Solid

**Analysis Batch:** 517989

**Prep Type:** Total/NA

**Prep Batch:** 514714

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total			RER	Limit		
					Uncert.	(2σ+/-)	LOQ	DLC	Unit		
Actinium 228	0.400		0.5363		0.171			0.0747	pCi/g	0.38	1
Actinium-227	0.126	U	0.09654	U	0.393			0.260	pCi/g	0.04	1
Americium-241	0.0348	U	0.04430	U	0.101			0.0676	pCi/g	0.04	1
Bismuth-212	0.00832	U	0.7366		0.356			0.0953	pCi/g	0.59	1
Bismuth-214	0.408		0.4920		0.142			0.0457	pCi/g	0.31	1
Cesium-137	-0.00006	U	0.01763	U	0.0440	0.0700		0.0339	pCi/g	0.12	1
	32										
Lead-210	1.15		0.6490	U	0.959			0.672	pCi/g	0.24	1
Lead-212	0.389		0.3847		0.104			0.0498	pCi/g	0.02	1
Lead-214	0.481		0.4558		0.128			0.0586	pCi/g	0.1	1
Potassium-40	8.28		7.969		1.55			0.252	pCi/g	0.09	1
Protactinium-231	0.000	U	0.2279	U	1.24			1.92	pCi/g	0.14	1
Protactinium-234	0.0328	U	0.1379	U	0.186			0.142	pCi/g	0.45	1
Radium-226	0.408		0.4920		0.142	0.200		0.0457	pCi/g	0.31	1
Radium-228	0.400		0.5363		0.171			0.0747	pCi/g	0.38	1
Thallium-208	0.126		0.2002		0.0611			0.0184	pCi/g	0.63	1
Thorium 228	0.389		0.3847		0.104			0.0498	pCi/g	0.02	1
Thorium-232	0.400		0.5363		0.171			0.0747	pCi/g	0.38	1
Thorium-234	0.0355	U	0.5752		0.546			0.380	pCi/g	0.52	1
Uranium-235	-0.168	U	-0.1657	U	0.260			0.272	pCi/g	0.01	1
Uranium-238	0.0355	U	0.5752		0.546			0.380	pCi/g	0.52	1

Eurofins TestAmerica, St. Louis

# QC Association Summary

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

## Rad

### Leach Batch: 514292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-2	HPPG-F-074	Total/NA	Solid	Dry and Grind	
160-42415-3	HPPG-SFU-TU100A-001	Total/NA	Solid	Dry and Grind	
160-42415-5	HPPG-SFU-TU100A-003	Total/NA	Solid	Dry and Grind	
160-42415-7	HPPG-SFU-TU100A-005	Total/NA	Solid	Dry and Grind	
160-42415-9	HPPG-SFU-TU100A-007	Total/NA	Solid	Dry and Grind	
160-42415-10	HPPG-SFU-TU100A-008	Total/NA	Solid	Dry and Grind	
160-42415-11	HPPG-SFU-TU100A-009	Total/NA	Solid	Dry and Grind	
160-42415-13	HPPG-SFU-TU100A-011	Total/NA	Solid	Dry and Grind	
160-42415-14	HPPG-SFU-TU100A-012	Total/NA	Solid	Dry and Grind	
160-42415-15	HPPG-SFU-TU100A-013	Total/NA	Solid	Dry and Grind	
160-42415-20	HPPG-SFU-TU100A-018	Total/NA	Solid	Dry and Grind	
160-42415-24	HPPG-SFU-TU100A-022	Total/NA	Solid	Dry and Grind	
160-42415-26	HPPG-SFU-TU100A-024	Total/NA	Solid	Dry and Grind	
160-42415-2 DU	HPPG-F-074	Total/NA	Solid	Dry and Grind	
160-42415-15 DU	HPPG-SFU-TU100A-013	Total/NA	Solid	Dry and Grind	

### Leach Batch: 514297

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-1	HPPG-F-073	Total/NA	Solid	Dry and Grind	
160-42415-4	HPPG-SFU-TU100A-002	Total/NA	Solid	Dry and Grind	
160-42415-6	HPPG-SFU-TU100A-004	Total/NA	Solid	Dry and Grind	
160-42415-16	HPPG-SFU-TU100A-014	Total/NA	Solid	Dry and Grind	
160-42415-17	HPPG-SFU-TU100A-015	Total/NA	Solid	Dry and Grind	
160-42415-19	HPPG-SFU-TU100A-017	Total/NA	Solid	Dry and Grind	
160-42415-21	HPPG-SFU-TU100A-019	Total/NA	Solid	Dry and Grind	
160-42415-22	HPPG-SFU-TU100A-020	Total/NA	Solid	Dry and Grind	
160-42415-25	HPPG-SFU-TU100A-023	Total/NA	Solid	Dry and Grind	
160-42415-27	HPPG-SFU-TU100A-025	Total/NA	Solid	Dry and Grind	

### Leach Batch: 514313

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-12	HPPG-SFU-TU100A-010	Total/NA	Solid	Dry and Grind	
160-42415-18	HPPG-SFU-TU100A-016	Total/NA	Solid	Dry and Grind	
160-42415-23	HPPG-SFU-TU100A-021	Total/NA	Solid	Dry and Grind	

### Prep Batch: 514699

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-24	HPPG-SFU-TU100A-022	Total/NA	Solid	Fill_Geo-21	514292
160-42415-25	HPPG-SFU-TU100A-023	Total/NA	Solid	Fill_Geo-21	514297
160-42415-26	HPPG-SFU-TU100A-024	Total/NA	Solid	Fill_Geo-21	514292
160-42415-27	HPPG-SFU-TU100A-025	Total/NA	Solid	Fill_Geo-21	514297
MB 160-514699/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514699/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

### Prep Batch: 514701

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-3	HPPG-SFU-TU100A-001	Total/NA	Solid	Fill_Geo-21	514292
160-42415-4	HPPG-SFU-TU100A-002	Total/NA	Solid	Fill_Geo-21	514297
160-42415-5	HPPG-SFU-TU100A-003	Total/NA	Solid	Fill_Geo-21	514292
160-42415-6	HPPG-SFU-TU100A-004	Total/NA	Solid	Fill_Geo-21	514297
160-42415-9	HPPG-SFU-TU100A-007	Total/NA	Solid	Fill_Geo-21	514292

Eurofins TestAmerica, St. Louis

# QC Association Summary

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42415-1  
SDG: GJ46599755

## Rad (Continued)

### Prep Batch: 514701 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-10	HPPG-SFU-TU100A-008	Total/NA	Solid	Fill_Geo-21	514292
160-42415-11	HPPG-SFU-TU100A-009	Total/NA	Solid	Fill_Geo-21	514292
160-42415-12	HPPG-SFU-TU100A-010	Total/NA	Solid	Fill_Geo-21	514313
160-42415-13	HPPG-SFU-TU100A-011	Total/NA	Solid	Fill_Geo-21	514292
160-42415-14	HPPG-SFU-TU100A-012	Total/NA	Solid	Fill_Geo-21	514292
160-42415-16	HPPG-SFU-TU100A-014	Total/NA	Solid	Fill_Geo-21	514297
160-42415-17	HPPG-SFU-TU100A-015	Total/NA	Solid	Fill_Geo-21	514297
160-42415-18	HPPG-SFU-TU100A-016	Total/NA	Solid	Fill_Geo-21	514313
160-42415-19	HPPG-SFU-TU100A-017	Total/NA	Solid	Fill_Geo-21	514297
160-42415-20	HPPG-SFU-TU100A-018	Total/NA	Solid	Fill_Geo-21	514292
160-42415-21	HPPG-SFU-TU100A-019	Total/NA	Solid	Fill_Geo-21	514297
160-42415-22	HPPG-SFU-TU100A-020	Total/NA	Solid	Fill_Geo-21	514297
160-42415-23	HPPG-SFU-TU100A-021	Total/NA	Solid	Fill_Geo-21	514313
MB 160-514701/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514701/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

### Prep Batch: 514709

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-15	HPPG-SFU-TU100A-013	Total/NA	Solid	Fill_Geo-21	514292
MB 160-514709/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514709/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-42415-15 DU	HPPG-SFU-TU100A-013	Total/NA	Solid	Fill_Geo-21	514292

### Prep Batch: 514714

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-1	HPPG-F-073	Total/NA	Solid	Fill_Geo-21	514297
160-42415-2	HPPG-F-074	Total/NA	Solid	Fill_Geo-21	514292
160-42415-7	HPPG-SFU-TU100A-005	Total/NA	Solid	Fill_Geo-21	514292
MB 160-514714/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514714/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-42415-2 DU	HPPG-F-074	Total/NA	Solid	Fill_Geo-21	514292

### Prep Batch: 516657

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-23	HPPG-SFU-TU100A-021	Total/NA	Solid	DPS-7	514313
MB 160-516657/23-A	Method Blank	Total/NA	Solid	DPS-7	
LCS 160-516657/1-A	Lab Control Sample	Total/NA	Solid	DPS-7	

### Prep Batch: 519394

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42415-3	HPPG-SFU-TU100A-001	Total/NA	Solid	DPS-7	514292
160-42415-13	HPPG-SFU-TU100A-011	Total/NA	Solid	DPS-7	514292
MB 160-519394/23-A	Method Blank	Total/NA	Solid	DPS-7	
LCS 160-519394/1-A	Lab Control Sample	Total/NA	Solid	DPS-7	

Eurofins TestAmerica, St. Louis

# Tracer/Carrier Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42415-1  
SDG: GJ46599755

## Method: 905 - Strontium-90 (GFPC)

Matrix: Solid

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Sr (40-110)	Y (40-110)
160-42415-3	HPPG-SFU-TU100A-001	88.0	90.5
160-42415-13	HPPG-SFU-TU100A-011	89.2	92.9
160-42415-23	HPPG-SFU-TU100A-021	80.8	96.4
LCS 160-516657/1-A	Lab Control Sample	86.3	97.3
LCS 160-519394/1-A	Lab Control Sample	85.3	92.3
MB 160-516657/23-A	Method Blank	82.2	94.0
MB 160-519394/23-A	Method Blank	84.0	92.6

### Tracer/Carrier Legend

Sr = Sr Carrier

Y = Y Carrier



## Environment Testing America

### ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-42461-1  
Laboratory Sample Delivery Group: D1189277  
Client Project/Site: HPNS-Parcel G 501197

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

---

Authorized for release by:  
7/31/2021 11:59:58 AM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
Rhonda.Ridenhower@Eurofinset.com

#### LINKS

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*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42461-1  
SDG: D1189277

**Job ID: 160-42461-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

Narrative

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-42461-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### RECEIPT

The samples were received on 06/17/2021; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 25.0 C.

## Case Narrative

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42461-1  
SDG: D1189277

### Job ID: 160-42461-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

##### **STRONTIUM-90 (GFPC)**

Sample HPPG-SFU-TU100A-B-001 (160-42461-1) was analyzed for Strontium-90 (GFPC) in accordance with EPA 905. The samples were dried on 06/17/2021, prepared on 07/15/2021 and analyzed on 07/27/2021.

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-518891/24-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

##### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Sample HPPG-SFU-TU100A-B-001 (160-42461-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 06/17/2021, prepared on 06/21/2021 and analyzed on 07/12/2021.

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-515241/1-A)

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

#### Inferred from      Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# CHAIN OF CUSTODY

Ref. Document # 501197RSY-075

Page 1 of 2

APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy

Sample Lead: Rizzo, Trevor

Sample Tech(s): John Naumann  
Stacy Hatch

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Project Number: 501197		Analysis Requested									
Project Name: Hunters Point Naval Shipyard: Parcel G Remedial Action											
Project Location: San Francisco, CA											
Purchase Order #: 1159058											
Shipment/Pickup Date: 6/15/2021											
Waybill Number: 1957 0325 9386											
Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046											
Lab Contact Name/ph # Rhoeda Ridenbower (314)298-8566											
Matrix	# of Containers	Gamma Spec (EPA 901.1 N) - Full 21 day ingrowth gamma									
		Stronium-90 (EPA 905 MWD)									
		Dose Rate uR/Hr	Evidence Bag ID		Comment						

## Special Instructions:

21 day ingrowth results only

Turnaround Time: 3-day  10-Day  28-day  Other  Level of QC Required: I II III Project Specific

Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; Sl. = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening

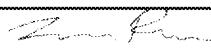
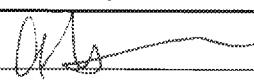
Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Rizzo, Trevor		06/15/2021 14:24	SHIPPEDTOLAB		06/15/2021 14:24

\*\*\* Last 3 transfers shown above - Complete list of transfers on last page \*\*\*

# All Transfers for COC 501197RSY-075

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Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Rizzo, Trevor		06/15/2021 14:24	SHIPPEDTOLAB		06/15/2021 14:24 06/15/2021 09:20

6/17/21 09:20



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-42461-1  
SDG Number: D1189277**Login Number:** 42461**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Worthington, Sierra M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42461-1  
SDG: D1189277

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42461-1  
SDG: D1189277

Method	Method Description	Protocol	Laboratory
905	Strontium-90 (GFPC)	EPA	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-7	Preparation, Digestion/Precipitate Separation (7-Day In-Growth)	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

## Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

## Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42461-1  
SDG: D1189277

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-42461-1	HPPG-SFU-TU100A-B-001	Solid	06/15/21 12:41	06/17/21 09:20

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42461-1  
SDG: D1189277

**Client Sample ID: HPPG-SFU-TU100A-B-001**

**Lab Sample ID: 160-42461-1**

Date Collected: 06/15/21 12:41

Matrix: Solid

Date Received: 06/17/21 09:20

## Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.209		0.194	0.195	0.331	0.145	pCi/g	07/15/21 15:19	07/27/21 19:00	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Sr Carrier	80.2		40 - 110					07/15/21 15:19	07/27/21 19:00	1
Y Carrier	99.7		40 - 110					07/15/21 15:19	07/27/21 19:00	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.480		0.133	0.142		0.0451	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Actinium-227	-0.287	U	0.548	0.549		0.317	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Americium-241	0.0526	U	0.114	0.115		0.0922	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Bismuth-212	-0.0140	U	0.473	0.473		0.388	pCi/g	06/21/21 16:29	07/12/21 07:14	1
<b>Bismuth-214</b>	<b>0.410</b>		0.0886	0.0983		0.0278	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Cesium-137	-0.0269	U	0.0575	0.0575	0.0700	0.0455	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Lead-210	0.537	U	1.09	1.09		0.867	pCi/g	06/21/21 16:29	07/12/21 07:14	1
<b>Lead-212</b>	<b>0.369</b>		0.0660	0.0815		0.0275	pCi/g	06/21/21 16:29	07/12/21 07:14	1
<b>Lead-214</b>	<b>0.372</b>		0.0741	0.0836		0.0355	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Potassium-40	6.94		0.974	1.21		0.0796	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Protactinium-231	0.000	U	0.610	0.610		1.57	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Protactinium-234	0.0455	U	0.206	0.206		0.169	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Radium-226	0.410		0.0886	0.0983	0.200	0.0278	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Radium-228	0.480		0.133	0.142		0.0451	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Thallium-208	0.113		0.0545	0.0558		0.0255	pCi/g	06/21/21 16:29	07/12/21 07:14	1
<b>Thorium 228</b>	<b>0.369</b>		0.0660	0.0815		0.0275	pCi/g	06/21/21 16:29	07/12/21 07:14	1
<b>Thorium-232</b>	<b>0.480</b>		0.133	0.142		0.0451	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Thorium-234	-0.299	U	0.992	0.992		0.811	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Uranium-235	-0.136	U	0.355	0.355		0.288	pCi/g	06/21/21 16:29	07/12/21 07:14	1
Uranium-238	-0.299	U	0.992	0.992		0.811	pCi/g	06/21/21 16:29	07/12/21 07:14	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42461-1  
SDG: D1189277

## Method: 905 - Strontium-90 (GFPC)

Lab Sample ID: MB 160-518891/24-A

Matrix: Solid

Analysis Batch: 520325

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 518891

Analyte	MB	MB	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Uncert.		(2σ+/-)	Uncert.						
Strontium-90	0.07805	U		0.228	0.229	0.331	0.182	pCi/g	07/15/21 16:52	07/27/21 19:09	1
<b>Carrier</b>	<b>MB</b>	<b>MB</b>									
<i>Sr Carrier</i>	%Yield	Qualifier	Limits								
Sr Carrier	60.6		40 - 110						07/15/21 16:52	07/27/21 19:09	1
Y Carrier	102		40 - 110						07/15/21 16:52	07/27/21 19:09	1

Lab Sample ID: LCS 160-518891/2-A

Matrix: Solid

Analysis Batch: 520324

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 518891

Analyte	MB	MB	Qualifier	Count	Total	LOQ	DLC	Unit	%Rec	Limits	%Rec.
	Result	Uncert.		(2σ+/-)	Uncert.						
Strontium-90	8.19			7.512	0.816	0.331	0.142	pCi/g	92	75 - 125	
<b>Carrier</b>	<b>MB</b>	<b>MB</b>									
<i>Sr Carrier</i>	%Yield	Qualifier	Limits								
Sr Carrier	76.8		40 - 110								
Y Carrier	101		40 - 110								

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-515241/1-A

Matrix: Solid

Analysis Batch: 518258

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 515241

Analyte	MB	MB	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Uncert.		(2σ+/-)	Uncert.						
Actinium 228	0.06269			0.0561	0.0564		0.0292	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Actinium-227	0.1490	U		0.302	0.303		0.167	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Americium-241	-0.04188	U		0.101	0.101		0.0801	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Bismuth-212	0.2769	U		0.651	0.651		0.507	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Bismuth-214	-0.09797	U		0.148	0.148		0.129	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Cesium-137	0.01799	U		0.0321	0.0322	0.0700	0.0232	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Lead-210	0.01570	U		0.830	0.830		0.682	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Lead-212	0.002127	U		0.0785	0.0785		0.0645	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Lead-214	-0.07995	U		0.151	0.152		0.0841	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Potassium-40	0.1578	U		0.439	0.440		0.323	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Protactinium-231	-0.0000003	U		2.12	2.12		1.74	pCi/g	06/21/21 16:29	07/12/21 07:50	1
	226										
Protactinium-234	0.08717	U		0.152	0.152		0.127	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Radium-226	-0.09797	U		0.148	0.148	0.200	0.129	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Radium-228	0.06269			0.0561	0.0564		0.0292	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Thallium-208	-0.02414	U		0.0505	0.0505		0.0334	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Thorium 228	0.002127	U		0.0785	0.0785		0.0645	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Thorium-232	0.06269			0.0561	0.0564		0.0292	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Thorium-234	0.2229	U		0.460	0.461		0.470	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Uranium-235	0.04516	U		0.0951	0.0952		0.255	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Uranium-238	0.2229	U		0.460	0.461		0.470	pCi/g	06/21/21 16:29	07/12/21 07:50	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42461-1  
SDG: D1189277

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID: LCS 160-515241/2-A**

**Matrix: Solid**

**Analysis Batch: 518256**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 515241**

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	LOQ	Total		%Rec.	Limits
		Result	Qual			DLC	Unit		
Americium-241	96.3	101.7		10.6		0.325	pCi/g	106	87 - 116
Cesium-137	26.4	24.90		2.65	0.0700	0.0865	pCi/g	94	87 - 120
Cobalt-60	8.78	8.121		0.858		0.0456	pCi/g	93	87 - 115

**Lab Sample ID: 160-42461-1 DU**

**Matrix: Solid**

**Analysis Batch: 518257**

**Client Sample ID: HPPG-SFU-TU100A-B-001**

**Prep Type: Total/NA**

**Prep Batch: 515241**

Analyte	Sample	Sample	DU		Uncert. (2σ+/-)	LOQ	Total		RER	Limit
	Result	Qual	Result	Qual			DLC	Unit		
Actinium 228	0.480		0.5331		0.137		0.0295	pCi/g	0.19	1
Actinium-227	-0.287	U	0.02140	U	0.0857		0.375	pCi/g	0.49	1
Americium-241	0.0526	U	0.07128	U	0.172		0.139	pCi/g	0.07	1
Bismuth-212	-0.0140	U	0.3141	U	0.553		0.414	pCi/g	0.32	1
Bismuth-214	0.410		0.4210		0.134		0.0529	pCi/g	0.05	1
Cesium-137	-0.0269	U	0.02049	U	0.0699	0.0700	0.0559	pCi/g	0.37	1
Lead-210	0.537	U	-0.3112	U	1.51		1.25	pCi/g	0.33	1
Lead-212	0.369		0.3506		0.0963		0.0486	pCi/g	0.10	1
Lead-214	0.372		0.4547		0.125		0.0587	pCi/g	0.40	1
Potassium-40	6.94		7.620		1.55		0.356	pCi/g	0.25	1
Protactinium-231	0.000	U	0.0000	U	0.317		2.17	pCi/g	0	1
Protactinium-234	0.0455	U	0.09957	U	0.238		0.192	pCi/g	0.12	1
Radium-226	0.410		0.4210		0.134	0.200	0.0529	pCi/g	0.05	1
Radium-228	0.480		0.5331		0.137		0.0295	pCi/g	0.19	1
Thallium-208	0.113		0.1031		0.0815		0.0373	pCi/g	0.07	1
Thorium 228	0.369		0.3506		0.0963		0.0486	pCi/g	0.10	1
Thorium-232	0.480		0.5331		0.137		0.0295	pCi/g	0.19	1
Thorium-234	-0.299	U	-0.2296	U	0.933		0.774	pCi/g	0.04	1
Uranium-235	-0.136	U	0.01364	U	0.491		0.404	pCi/g	0.18	1
Uranium-238	-0.299	U	-0.2296	U	0.933		0.774	pCi/g	0.04	1

Eurofins TestAmerica, St. Louis

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42461-1  
SDG: D1189277

Rad

Leach Batch: 514724

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42461-1	HPPG-SFU-TU100A-B-001	Total/NA	Solid	Dry and Grind	
160-42461-1 DU	HPPG-SFU-TU100A-B-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 515241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42461-1	HPPG-SFU-TU100A-B-001	Total/NA	Solid	Fill_Geo-21	
MB 160-515241/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-515241/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-42461-1 DU	HPPG-SFU-TU100A-B-001	Total/NA	Solid	Fill_Geo-21	514724

Prep Batch: 518891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42461-1	HPPG-SFU-TU100A-B-001	Total/NA	Solid	DPS-7	
MB 160-518891/24-A	Method Blank	Total/NA	Solid	DPS-7	
LCS 160-518891/2-A	Lab Control Sample	Total/NA	Solid	DPS-7	

# Tracer/Carrier Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42461-1  
SDG: D1189277

**Method: 905 - Strontium-90 (GFPC)**

**Matrix: Solid**

**Prep Type: Total/NA**

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr (40-110)	Y (40-110)
160-42461-1	HPPG-SFU-TU100A-B-001	80.2	99.7
LCS 160-518891/2-A	Lab Control Sample	76.8	101
MB 160-518891/24-A	Method Blank	60.6	102

## Tracer/Carrier Legend

Sr = Sr Carrier

Y = Y Carrier



## Environment Testing America

### ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-42477-1  
Laboratory Sample Delivery Group: D1189266- resample  
Client Project/Site: HPNS-Parcel G 501197

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

---

Authorized for release by:  
7/19/2021 10:37:25 PM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
Rhonda.Ridenhower@Eurofinset.com

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*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42477-1  
SDG: D1189266- resample

**Job ID: 160-42477-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

Narrative

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-42477-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### RECEIPT

The samples were received on 06/21/2021; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 26.3 C.

### RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

## Case Narrative

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Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42477-1  
SDG: D1189266- resample

### Job ID: 160-42477-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Sample HPPG-SFU-TU100A-006 (160-42477-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 06/22/2021, prepared on 06/24/2021 and analyzed on 07/16/2021.

The method blank (MB) z-score associated with Prep Batch 160-515890 is within limits and is stored in the level IV raw data. (MB 160-515890/1-A)

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from      Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



APTM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520

## CHAIN OF CUSTODY

Ref. Document # 501197-RSP-081 Page 86 of 93  
Page 1 of 2Project Manager: Lisa Bercik 619 446 4508  
(Name & phone #)Send Report To: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy  
City: Concord, CA, 94520

Sampler's Name(s):

Sample ID Number	Sample Description	Date	Time	Method	Preservative (water)	Preservative (soil)	A/N	Comments
HPPG-SFU-TU100A-006	HPNS Parcel G SFU-TU100A Systematic Resample	6/17/21	1341	G	SD	t	X	16 oz. plastic jar

Special Instructions: 21 day ingrowth results only

Evidence bagged P 1189366

<input type="checkbox"/> 24-hr <input type="checkbox"/> Standard TAT -10-day <input type="checkbox"/> 3-day <input type="checkbox"/> 10-day		Level Of QC Required: I      II      III      Project Specific						
Relinquished By:		Date:	Received By:		Date:		<b>Method Codes</b>  DW = Drinking Water GW = Ground Water WW = Waste Water A = Air	<b>Matrix Codes</b>  C = Composite     G = Grab  SG = Soil SL = Sludge CP = Chip Samples
		Time:						
Relinquished By:		Date:	Received By: M/S		Date: 6/17/21			
		Time:			Time: 09:30			
Relinquished By:		Date:	Received By:		Date:			
		Time:			Time:			
Relinquished By:		Date:	Received By:		Date:			
		Time:			Time:			

ABS=Asbestos, PO=Pipe Opening

see next page

ED\_006360A\_00000147-00086

## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-42477-1  
SDG Number: D1189266- resample**Login Number:** 42477**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Worthington, Sierra M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42477-1  
SDG: D1189266- resample

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

## Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42477-1  
SDG: D1189266- resample

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

### Protocol References:

DOE = U.S. Department of Energy

None = None

### Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42477-1  
SDG: D1189266- resample

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-42477-1	HPPG-SFU-TU100A-006	Solid	06/17/21 13:41	06/21/21 09:30	

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42477-1  
SDG: D1189266- resample

**Client Sample ID: HPPG-SFU-TU100A-006**

**Lab Sample ID: 160-42477-1**

Date Collected: 06/17/21 13:41

Matrix: Solid

Date Received: 06/21/21 09:30

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.194		0.125	0.126		0.107	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Actinium-227	0.0846	U	0.325	0.325		0.271	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Americium-241	-0.0616	U	0.0823	0.0825		0.111	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Bismuth-212	-0.347	U	0.686	0.687		0.536	pCi/g	06/24/21 12:16	07/16/21 18:50	1
<b>Bismuth-214</b>	<b>0.286</b>		0.109	0.113		0.0396	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Cesium-137	0.00590	U	0.0440	0.0440	0.0700	0.0356	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Lead-210	0.508	U	0.945	0.947		0.651	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Lead-212	0.207		0.0621	0.0676		0.0323	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Lead-214	0.209		0.0945	0.0969		0.0463	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Potassium-40	5.39		0.998	1.14		0.258	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Protactinium-231	0.000	U	0.649	0.649		1.81	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Protactinium-234	0.166		0.0921	0.0936		0.158	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Radium-226	0.286		0.109	0.113	0.200	0.0396	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Radium-228	0.194		0.125	0.126		0.107	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Thallium-208	0.0903		0.0407	0.0417		0.0176	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Thorium 228	0.207		0.0621	0.0676		0.0323	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Thorium-232	0.194		0.125	0.126		0.107	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Thorium-234	-0.420	U	0.547	0.549		0.466	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Uranium-235	-0.177	U	0.353	0.353		0.369	pCi/g	06/24/21 12:16	07/16/21 18:50	1
Uranium-238	-0.420	U	0.547	0.549		0.466	pCi/g	06/24/21 12:16	07/16/21 18:50	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

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 Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-42477-1  
 SDG: D1189266- resample

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

**Lab Sample ID:** MB 160-515890/1-A

**Matrix:** Solid

**Analysis Batch:** 518903

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 515890

Analyte	Result	MB	MB	Qualifier	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac	
					Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.03156	U			0.0934	0.0935	0.0625	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Actinium-227	-0.005764	U			0.0119	0.0119	0.304	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Americium-241	0.03314	U			0.0758	0.0759	0.0597	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Bismuth-212	0.2841	U			0.583	0.584	0.448	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Bismuth-214	0.03023	U			0.0229	0.0231	0.129	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Cesium-137	0.008523	U			0.0418	0.0418	0.0700	0.0333	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Lead-210	0.2243	U			0.766	0.767	0.609	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Lead-212	-0.01223	U			0.0190	0.0190	0.0650	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Lead-214	0.02442	U			0.0232	0.0233	0.0584	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Potassium-40	0.1420	U			0.583	0.584	0.270	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Protactinium-231	0.1436	U			0.885	0.885	1.37	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Protactinium-234	-0.008096	U			0.0284	0.0284	0.134	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Radium-226	0.03023	U			0.0229	0.0231	0.200	0.129	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Radium-228	0.03156	U			0.0934	0.0935	0.0625	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Thallium-208	0.02972				0.0542	0.0543	0.0193	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Thorium 228	-0.01223	U			0.0190	0.0190	0.0650	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Thorium-232	0.03156	U			0.0934	0.0935	0.0625	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Thorium-234	0.0000	U			0.0848	0.0848	0.500	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Uranium-235	0.06719	U			0.137	0.137	0.235	pCi/g	06/24/21 12:16	07/16/21 18:10	1	
Uranium-238	0.0000	U			0.0848	0.0848	0.500	pCi/g	06/24/21 12:16	07/16/21 18:10	1	

**Lab Sample ID:** LCS 160-515890/2-A

**Matrix:** Solid

**Analysis Batch:** 518909

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 515890

Analyte	Spike Added	LCS Result	LCS Qual	Total			%Rec	Limits
				Uncert. (2σ+/-)	LOQ	DLC		
Americium-241	96.3	94.50		9.92		0.520	pCi/g	98 87 - 116
Cesium-137	26.4	25.86		2.75	0.0700	0.0579	pCi/g	98 87 - 120
Cobalt-60	8.76	8.443		0.889		0.0259	pCi/g	96 87 - 115

Eurofins TestAmerica, St. Louis

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-42477-1  
SDG: D1189266- resample

Rad

Leach Batch: 515426

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42477-1	HPPG-SFU-TU100A-006	Total/NA	Solid	Dry and Grind	

Prep Batch: 515890

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42477-1	HPPG-SFU-TU100A-006	Total/NA	Solid	Fill_Geo-21	515426
MB 160-515890/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-515890/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	